American Forestry

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REPORTS ON FORESTRY INVESTIGATIONS

AFTER a year's hard work the Forestry Committee of the National Conservation Congress, and its ten sub-committees, are now preparing the reports to be made at the sessions of the Congress in Washington, D. C., on Nov. 18, 19 and 20.

These reports will, it is expected, inaugurate the most important forward step in forest conservation and scientific lumbering that has occurred in many years. Made up, as the committees are, of a combination of theoretical and practical experts on the subjects assigned to them, they have been enabled by the large amount of information it has been possible for them to secure, to reach conclusions on the different subjects which represent the most advanced and up-to-date thought and development.

The importance of these conclusions to the forestry and lumbering interests it is impossible to estimate. Long-established policies regarding various conditions may, and doubtless will be, materially affected. It is hoped that the vexing question of forest taxation, long a matter of contention, argument, and more or less legislation in every state, will receive such treatment by the committee having it in charge, that the way may be pointed to a solution of the present problem in many States. It is believed that the difficulties caused by other forest and lumbering problems may also be easier of solution as a result of the reports of these committees.

Owing to the widespread nature of the investigations, to the fact that every section of the United States is affected, and that at least two sessions of the Congress, and possibly more, will be entirely given over to forestry addresses, it is expected that there will be at the Congress the largest gathering of foresters and lumbermen, and those interested in forest conservation, that the United States has ever seen. President Charles Lathrop Pack, of the Conservation Congress, has already received assurances from several hundred that they will make a special effort to attend.

The American Forestry Association, which has financed the work of the forestry investigation committees, placing at their disposal a fund of five thousand dollars, will invite all its members to attend the Congress and participate in the discussions of forestry matters. During the entire three days' session there will be a special forestry conference in the Cabinet Room at the New Willard Hotel, except when the main session of the Congress is devoted to addresses on forestry and questions affecting the foresters and lumbermen. At this special conference the reports of the forestry committee and subcommittees will be discussed in detail.

At the main session of the Congress, devoted to forestry and at which Dr. Henry S. Drinker, president of the American Forestry Association, has been invited to preside, there will be addresses on forestry by some of the leading men of the country.

Another feature of the gathering here, but entirely distinct from the main Congress, will be a forestry banquet to be given at Rauscher's on the evening of November 19, under the auspices of a committee of the American Forestry Association and the Forestry Committee of the Congress. It is expected that fully four hundred

will be present at this banquet, and it will be the occasion for several notable addresses.

The official call for the Congress is now being sent out. Regarding the forestry feature of the gathering, it says:

"Protection of our forests and our waterways is the great Conservation issue before us today. Our forests and our water powers are at stake.

"Within the next few months, the fight for the protection of our forests and our waterways will be in the Congress of the United States and in State Legislatures. Now is the time for all persons who believe in conservation to get together and speak in no uncertain terms on these questions.

"Conservation originated with forestry. It took form through plans for the protection of the nation's waterways. These two ideas suggested the first conservation meeting, the Conference of Governors at the White House, five years ago. Now facing the greatest contest this movement has known—the fight to save our forests and our water powers to the people—the Congress comes back to the seat of the nation's government to hold its meeting this year.

"The Congress is to be devoted largely to forest conservation, because of the national importance of the subject in its many phases. Public interest is involved, because upon the proper solution of the various problems depends the cost of the wood without which our civilization would decline; the perpetuation of the timber supply; the development of hydro-electric power; the utilization of non-agricultural lands; the availability of water for irrigation; the preservation of forest areas for health and recreation, and many other developments essential alike to every citizen from the lumberman to the man who owns neither a tree nor a foot of land.

"Here are some of the reasons why the Congress puts forestry foremost at this year's meeting:

Forest fires continue to destroy lives by hundreds and tangible assets averaging upwards of fifty million dollars annually, and do incalculable damage to soil, water, and young growth.

Forest insects destroy enough timber every year to finance the construction program of the navy.

Floods follow forest denudation, and the disasters of this year can be traced in part, at least, to non-forested watersheds.

We are using three times as much timber as grows each year, and worst of all are utilizing only forty to seventy per cent of each tree cut down; while fire destroys the equivalent of each year's new growth.

The tax laws in most States do not recognize forests as a crop to be perpetuated, but act to destroy the timber resources for the enrichment of the present to the poverty of the future.

The preservative treatment of timber is a potent factor in conservation, since it reduces the consumption and makes inferior species available. At present about 20 per cent of the crossties, but less than 1-3 of 1 per cent of the lumber used, is treated.

Despite the obvious public need, there is strong opposition to the development of a safe national forest policy.

While the future is not secure, definite progress has been made in the following ways:

Forest fire associations among timberland owners, by publicity and systematic organization, are materially reducing forest fire losses.

The Federal Government controls, on the National Forests, about one-fifth of the standing timber, and by proper utilization and protection makes it a present asset and a perpetual resource.

A majority of the forested States have organizations which are doing effective work in forest protection and education.

Two States, Pennsylvania and Louisiana, have this year enacted forest taxation laws based on correct

principles, and other States are agitating similar legislation.

While intensive forest management, on the European plan, has not been applied on private holdings, the lumbermen are slowly realizing that their business is furthered by cooperation with public interests. Forestry and lumbering are receiving mutual recognition, which will make for forest conservation under the combined stimulus of education and economic development.

There is fairly well defined public interest in forest conservation, but it must be stipulated to the point of forcing necessary reforms.

"The National Conservation Congress seeks, through education and investigation, to establish a sound forest policy, both in the broad national aspects and in essential details, and to support and strengthen the progressive forest work now being done. The Forestry Committee, through its subcommittees and affiliation with the American Forestry Association, has unequaled facilities for effective investigation, and wide publicity and education. With your help it desires to do more and do it better."

GOVERNMENT FINDS VARIANCE IN MOUNTAIN SURVEYS

IN surveying mountain lands in the Southern Appalachian and White Mountain regions with a view to Government purchase under the Weeks law, the Forest Service surveyors find that the tracts, in many cases, contain more land than the acreage set by the original surveys. Taking the region as a whole, the acreage of lands surveyed by the Government exceeds by one per cent the acreage believed to be in the tracts by the people offering the lands.

In certain instances the discrepancies of the old surveys, made generally with a compass and by surface measurements, are much more than this amount. Such an instance is that of a tract in northeastern Tennessee, which was supposed by the owners to contain 850 acres. The survey by the Forest Service, made with a transit and by horizontal measurements, credits the tract with 1,481.88 acres. Over-runs of this kind, amounting to from five to eight per cent, have been shown in a good many tracts.

On the other hand, these increases are partly offset in other cases in the rougher hill country, where the old surface measurements gave an excess over the actual amounts the tracts contain by the Government's horizontal surveys. Perhaps the most frequent cause of shrinkage is in the location of overlappings by some older grant which results in the elimination from the tract of some part or parts which were considered as belonging to it.

GOVERNMENT LUMBER PRICE LISTS.

The Forest Service has decided to resume the compilation of lumber price lists, which work was discontinued some months ago because it was thought that the records maintained by the lumber associations were sufficient, etc., and Chief Forester Graves has issued instructions that lumber prices shall be compiled along the same lines as instituted in 1908, except that a small number of representative mills in each of the principal producing regions only will be asked to state prices based upon actual sales and on selected grades. The lists are to be compiled quarterly with such comments as are necessary to explain fluctuations, etc.

THE QUEST OF THE GOLDEN TREELET

By Forrest Crissey

THROUGH the great lumber woods about his Wisconsin home "Hannes" Koehler thirty-five years ago used to ramble, boy-fashion, inhaling the spicy odors of pine and balsam, gathering dirt, delight, and woodsy impressions with equal impartiality. He loved the woods and the song of the wind through them. He found that every tree he stopped to examine had an individuality of its own.

Lying on his back one day beneath one of his favorites, his hand fondled a bit of protruding root, broke it off and carried it automatically to his mouth. He tasted it. He liked it—even better than licorice. He sat up and examined the tiny treelet with the red berries, broke off another piece of root and carried it home.

His father explained that it was ginseng—a plant of mystery that the Chinese held in high reverence as a panacea for all bodily ills, and that as early as 1750 its roots had been sold in Vermont and the East for thirty-four cents a pound. Thirty-four cents a pound astonished Hannes. He felt like a lad who had discovered the golden fleece.

As the author of "The Boy Scouts" would say, the small hero of our forestral tale did not then dream that he was to become known as The Ginseng King. In learning the arduous details of lumbering he found matters of seeming more moment to think about.

But meanwhile ginseng history was in its American making, and the stage was being set for the entre of the hero who bore on his shoulder the twigs from the tiny treelet with the red berries. About 1880 the United States Department of Agriculture made an official announcement that stirred the soul of a certain man in Missouri. In substance, the department asserted that ginseng could not be cultivated in America. Instantly the man in Missouri declared that it could be cultivated, and swore with an oath that he would "show the gov'ment." The Missourian knew something about ginseng. He knew that in the year previous the United States had exported about a half million dollars' worth of dried ginseng roots from native plants growing wild in the woods. He believed it would pay to cultivate this queer crop at the prevailing price, which was around $1.25 a pound. He felt so sure that he could raise it that he was confident he could "show the gov'ment."

FIRST ATTEMPTS FAILURES.

For three years he saw each attempt that he made fade into practical failure. But all the time he was "learning something about the nature of the animal." The fourth year he got a foothold and the fifth saw him well started. Then the scoffers wanted to buy plants and seeds and, feeling that he had "shown the gov'ment," he would not sell. In the ninth year of his struggle his ginseng garden brought him $25,000. He felt then that he had "shown the gov'ment!" Shortly afterward, so the ginseng authorities maintain, he was offered $100,000 for his little garden of a quarter acre—a figure that staggers belief but is authenticated by the records.

Then the newspapers made the Missourian famous and a genuine ginseng boom was started. It was demonstrated that domesticated ginseng could be grown and that there was an export market for it.

Of the thousands who read the story of the Missourian and saw sudden fortune in a shaded little forest in miniature was one Hannes Koehler, now signing to the checks of a lumber concern the dignified name, J. H. Koehler.

Local repute has it that suddenly dignified J. H. Koehler got ginseng crazy. When he put up his slat screen and explained to curious friends and neighbors the purpose which it was to

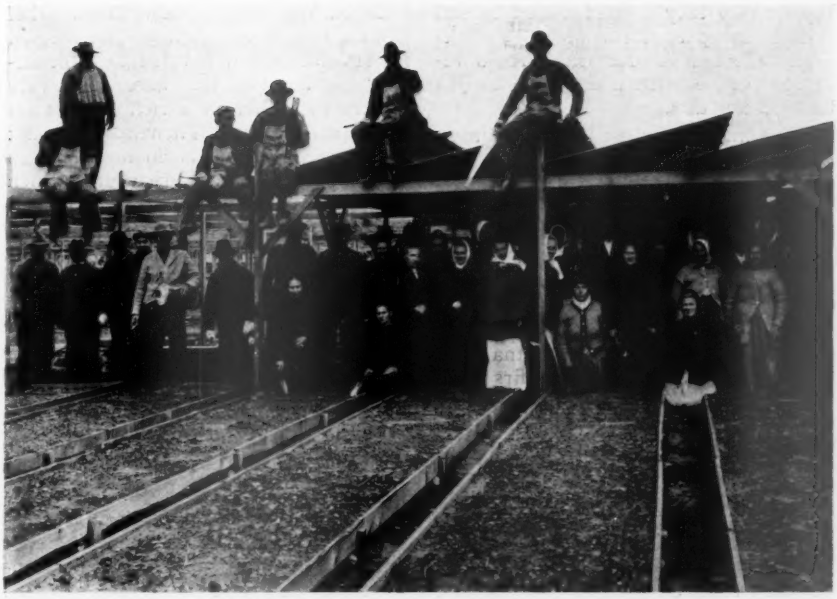


Photo by J. H. Koehler.

A CREW OF MEN AND WOMEN PLANTING GINSENG ROOTS AND SEED AND CONSTRUCTING A SHADE ARBOR OF A SIX-ACRE GARDEN.

serve, they openly jeered him and suggested that he showed signs of needing restraint. But the ginseng dream of days gone by had come back to the "Hannes" matured. Ginseng was too deeply rooted in him to be blighted by a little scoffing. Hadn't he, long before, sought for the plant only to find it unaccountably scarce? Didn't he have the idea before this "man from Missouri?" Yes, and now hadn't he let the "man from Missouri" beat him out?

HOW THE PATCH DRANK MONEY.

Ginseng roots, he discovered little by little, need more care in the raising than does a young child. They require a growth of four or five years before they are of marketable size. His tiny patch seemed fairly to drink money, and before the enterprise brought in enough to support itself he had $3,700 invested —mainly for seed, roots, labor and screening material. And even after the self-supporting point had been reached he was often called upon to "sweat blood." There was a constant call for money and in the five years after his garden began to produce his investment was increased by $14,194.40. One of the features of his struggle was the harassing influence that his enterprise had on his credit. He was known as a keen business man in his lumber trade, yet the dispensers of credit never failed to remember that he was "crazy on ginseng," and that consideration was always figured into the score.

There were many dark days and a certain black year in his experience as ginseng grower. The boom of the early nineties swept the country so completely that ginseng seeds were sold by count instead of by weight, and in some cases commanded as high as five cents each. And the young roots for planting were being sold at exorbitant prices. Some unscrupulous dealers in seed experienced such a call and had so small a

supply that they were induced to sell Indian turnip seed for ginseng. Naturally the market for dried roots reflected the situation and soared to $10 and $12 a pound.

Then things happened. Those growers who had get-rich-quick blood in their veins began to force their plants by the application of artificial fertilizers. Suddenly they discovered that the ginseng roots were diseased and rotting. They pulled them out by the wholesale and spread them for drying. But this did not check the decay. Then there was only one other step left and this was to use artificial heat. Some exporters were taken in on this basis—but the Chinese importers were quick to discover the deception and the market for cultivated ginseng slumped like a winter's snow in a spring rain.

It was just at this critical turn in the history of American ginseng that Mr. Koehler was ready to put his first crop of dried roots on the market.

From $12 to $3 a pound is a market decline that is staggering—and shrewd buyers did their best to further the depression, knowing that here was a rare chance to gather in a rich harvest on their own terms. Their slogan was: "Cultivated ginseng is doomed." Even the Department of Agriculture, which had previously issued a bulletin describing ginseng culture as a possible means of profit to American growers, felt impelled to send out a message of caution. The press took up the cry and anti-ginseng articles were as popular as had been the accounts of the success of the man in Missouri a little while before.

The result of all this was a "frost" which not only thinned out the ranks of the smaller growers who had started gardens but nipped in the bud hundreds of incipient projects. But it didn't scare the man in Wisconsin and a few of his compatriots who were deepest in the business. They saw a return

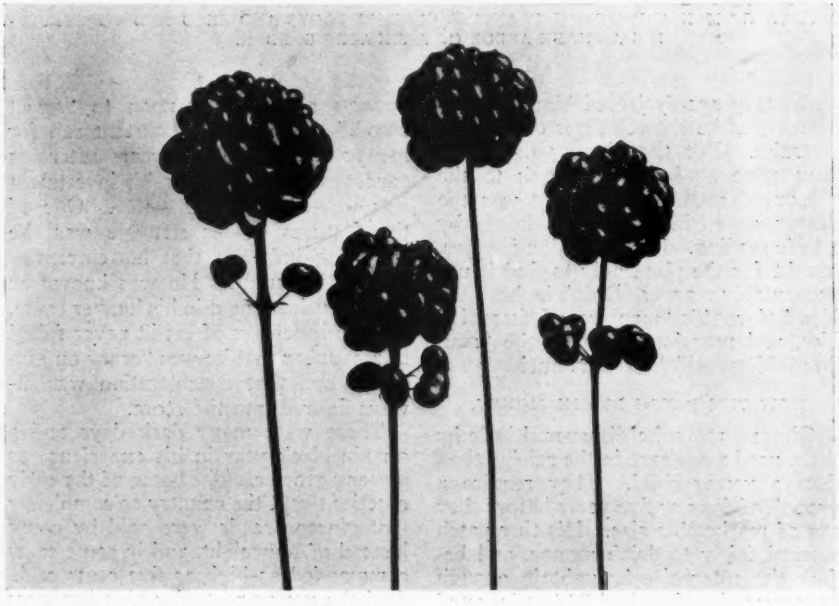


Photo by J. H. Koehler.

SHOWING MATURED SEED HEADS, THREE-FOURTHS NATURAL SIZE. THE NUMBER OF SEEDS IN EACH HEAD WERE 97, 75, 86 and 92, RESPECTIVELY. THESE SEED HEADS WERE PRODUCED BY PLANTS IN THEIR FOURTH YEAR'S GROWTH.

Photo by J. H. Koehler.

A FIELD OF GINSENG PLANTS IN THEIR FIRST YEAR'S GROWTH. THERE ARE ABOUT NINE HUNDRED THOUSAND PLANTS IN THIS FIELD. IN THE BACKGROUND OLDER PLANTS MAY BE SEEN.

Photo by J. H. Koehler.

A FIELD OF GINSENG PLANTS AS THEY APPEAR IN THEIR SECOND YEAR'S GROWTH. THERE ARE ABOUT SIX HUNDRED THOUSAND PLANTS IN THIS FIELD.

to normal conditions and hedged for them by refusing to sell—allowing their roots to stay in the ground and grow along with the demand and the prices. It was almost as exciting a game as Wall Street, and they played it right. In 1906 and 1907 the buyers, finding that their supply was cut short and in the hands of a few men who could not be fooled by the scare against the cultivated ginseng, paid the toll in the form of $6 to $7 a pound.

This was only one phase of the big "set-back." The large growers learned other things besides the art of whipsawing the market, as practiced by the buyers, and the danger of forcing their plants. When the boon was on, the pressure for seeds and young roots was so great that this was regarded as the end of the business yielding the greatest immediate profit; with the bottom out of the boom the growers saw no market for seed and therefore debudded their plants and prevented them from going into bloom. At the end of the season, Mr. Koehler and the little group of growers whose nerve had held them in the game, pulled up some of their plants to see what had happened. They found that the roots of the debudded plants had made remarkable growth. Next those roots were dried and another interesting development was apparent. The roots of the debudded plants did not shrink nearly so much as those of plants allowed to produce seed. In other words, they had been producing and selling seed at a loss; there was more money in putting the growth into the roots to be sold in dried form on the export market. All ginseng roots may look alike to the uninitiated American—but not to the Orientals who are the actual consumers, and for that reason Mr. Koehler determined that the way to take the premiums of the trade was to produce roots of the highest quality—something that was unconsidered in the days when ginseng gardens were being started by the hundreds and the demand for seeds and young roots was so keen that no questions were asked so long as the roots and seeds were genuine ginseng.

Therefore he pioneered the work of putting the ginseng plant on the pedigree basis, recognizing that the only road to high quality lay along the line of scientific breeding and development, of individual attention to individual plants. As a result his garden has been under constant observation by the experts of the Department of Agriculture and he has established himself as an authority in this country, at least, on ginseng culture.

A BUSINESS STATEMENT.

Being a thorough and trained business man, Mr. Koehler has kept books on his ginseng venture and can tell the cost of every operation, the exact amount of each item of income and the balance of business at every point in the game. As all the business of the enterprise was transacted through the local bank, in a special account, he is in position to substantiate his financial statement in all particulars by a form of evidence which the commercial world is accustomed to accept. Probably this is fortunate—for the average stranger would naturally find difficulty in accepting figures so sensational without some collateral evidence. Here is a condensed statement of the main features of the business which changed Mr. Koehler's title from "Ginseng Crank" to "Ginseng King":

Total capital invested during years 1901, 1902 and 1903	$ 3,700.00	
Total expenditures (including all labor and all other items of expense whatsoever connected with the business) after the business became self-sustaining	14,194.49	
Total expenditures including original investment	$17,894.49	
Total income from sales of product		$58,994.49
Total net profits	$41,100.00	
	$58,994.49	$58,994.49

Average time that the $3,700 was invested, 8 years, 1 month.

Photo by J. H. Koehler.

A FIELD OF GINSENG PLANTS IN SEPTEMBER WHEN THE SEEDS ARE RIPE AND READY TO BE HARVESTED. THE PLANTS ARE FIVE YEARS OLD AND WERE DUG AND MARKETED IN THE FALL OF 1912.

Average per cent of net profits, 137.-42 per cent per annum.

The business paid back the entire capital invested, together with 6 per cent interest within six years from the time the first dollar was invested, and after that an average net profit of 360 per cent per annum, calculated on the original investment.

The total area of land occupied was 32,256 square feet, or a trifle less than three-fourths of an acre.

The progress of the venture, from year to year, is indicated by the following table which can hardly fail to be as interesting to any active, honorary, or prospective ginseng grower as a Government crop report is to a Board of Trade operator:

Year, ending Dec. 31	Area planted		Dividends paid		Expenditure.	Original Investment	Income from sales
	Sq. Ft.	Acres	Per cent	Amount			
1901	3,456	0.08				$1,600.	
1902	2,304	0.05				800.	
1903	10,764	0 25				1,300.	
1904					$1,200.30		$ 2,854.04
1905	3,060	0.07	27.02	$ 1,000	1,250.13		1,704.71
1906	2,856	0.07	40.54	1,500	604.29		1,127.88
1907	9,816	0.22	64.86	2,400	1,484.28		3,795.50
1908			424.32	15,700	3,680.69		19,485.80
1909			27.02	1,000	1,936.78		3,080.09
1910			627.02	23,200	4,038.02		26,946.47
Totals	32,256	0.74	1210.78	$44,800	$14,194.49	$3,700.	$58,994.49

Mr. Koehler is satisfied that his venture would have been still more profitable had he consistently followed the policy of producing dried roots for the export market, instead of deriving a large part of his income from the sale of seeds and young planting stock. His experiment, however, would not have been quite so intensive under that plan as it would have required a larger area of ground towards the close of the transaction.

AN OFFICIAL REPORT.

Naturally, all those who show symptoms of the ginseng fever will wish to know something of the market history of this "freak" crop. Here is a table taken from an official report of the United States Department of Commerce and Labor, giving the figures of the ginseng export trade out of this country for the last fifty-three years:

Years.	Pounds.	Average Price.	Total value year's export.
1858	366,053	$0.52	$ 193736
1868	370,066	1.02	380.454
1878	421,395	1.13	497,247
1888	308,365	2.13	657,358
1889	271,228	2.33	634,091
1890	223,113	2.71	605,233
1891	283,000	3.39	959,992
1892	228,916	3.51	803,529
1893	251,205	3.15	619,114
1895	233,236	3.54	826,713
1896	199,436	3.86	770.673
1897	179,573	4.71	846,686
1898	174,063	3.66	638,446
1899	196,196	3.98	782,540
1900	160,101	5.20	833,710
1901	149,069	5.38	801,672
1902	154,063	5.55	856,515
1903	151,985	5.23	796,008
1904	131,882	6.45	851,820
1905	146,576	7.30	1,069,849
1906	160,949	7.30	1,175,844
1907	117,696	6.90	813,023
1908	154,180	7.21	1,111,994
1909	186,257	6.82	1,270,179
1910	192,406	7.48	1,439,434
1911	153,999	7.06	1,088,202
1912	155,308	7.20	1,119,301
1913	221,901	7.50	1,665,731

The student of this table will notice that the increase in price has been much more rapid than the decrease in quantity. It seems probable that American ginseng growers will never again face quite so severe a set-back as that of 1905, which was produced by the cry that cultivated ginseng was inferior to wild roots and would not prove acceptable to Chinese importers and consumers—for investigation has revealed the fact that the Chinese themselves cultivate ginseng to some extent and ex-

ARE FIVE YEARS OLD AND WERE DUG AND MARKETED IN THE FALL OF 1912.

Photo by J. H. Koehler.

FOURTEEN SUGAR BARRELS AND FOUR SMALL COFFEE DRUMS, CONTAINING 1,343½ POUNDS OF DRIED GINSENG ROOTS READY FOR SHIPMENT BY EXPRESS. THE SHIPMENT WAS SOLD IN MAY, 1913, AND BROUGHT $8,061.00. THE SHIPMENT REPRESENTS THE CROP FROM ONE-HALF ACRE OF GROUND.

perience has shown that, for several years, the average price for good American cultivated roots has been a little higher than that paid for wild roots.

FUTURE PROSPECTS.

Is an over-production of ginseng likely? Not for at least twenty-five years, according to Mr. Koehler. And in saying this he declares that he takes into account a probable large increase in the number of growers and of the volume produced. And, in his opinion, prices will remain at a point where the intelligent producer can make a profit beyond that time. His own experience shows him that the cost of producing a pound of first-class dried ginseng root is below two dollars. For some years the price to the growers for first-class roots has not fallen below $6 and has been as high as $7.25. He can see no possible chance of a shrinkage in the demand—for John Chinaman does not change his habits and race suicide is unknown in the land of the Mandarin. The word "ginseng" means panacea and John's faith in its curative and vitalizing powers is hardly less than his faith in the chief gods of his temples.

But the main peril to the future price of this strange crop lies, in the opinion of this expert, in a repetition of the shifty tactics on the part of American growers, that gave the buyers their basis for the cry that cultivated ginseng was unacceptable to the Chinese. Forcing growth by artificial heat, with any other makeshifts that tend to lower the quality of the root from the Chinese viewpoint, are almost sure to give the American grower a black eye in the matter of price.

COST OF STARTING.

The cost of starting a ginseng garden is problematical. It should not be undertaken, even as a side line and on a small scale, by any person who has not a rich stock of patience and a capital of at least a few hundred dollars. The problem should be approached cautiously and studiously. Impulse is a poor asset on which to launch a ginseng gar-

den, for it is a waiting game in which the stayer takes the prizes.

Young roots for planting, cost, at the present time, about $50 a thousand if they are of the best quality, and about 43,500 roots are required to plant a quarter acre of ground. The soil should be rich, loamy and full of humus. Seed of good quality costs about $6 a thousand kernels. These figures, however, are inadequate, as the basis for estimating the cost of starting a garden. A better guide are those in Mr. Koehler's statement. It is the part of wisdom for the amateur who is inclined to try this novel crop to first familiarize himself with about all the authentic literature on the subject—including the bulletins issued by the United States Department of Agriculture. He will also do well to seek the advice of that department. State experiment stations have, so far as can be learned, done but little work along the line of ginseng investigation. Finally, he should consult a practical and successful grower who looks for his revenue to the export market rather than to the sale of seeds and young roots for planting. A grower of this character is in better position to give unprejudiced advice. At least his interest does not lie in the direction of a desire to have you engage in the enterprise—but rather the reverse. After you have absorbed the best literature on the subject and taken counsel of the Department of Agriculture and of a successful grower, you will be in a position to decide whether you will join the ranks of this group of "freak farmers" and compete for the crown of the Ginseng King, or will stick to less intensive and less exciting crops.

SOME EXPERT ADVICE.

According to Mr. Koehler the beginner will do well to buy his seed and his young roots from a ginseng grower rather than from a dealer, for two reasons: ginseng seed once allowed to become dry is worthless, although it can be moistened and restored to an appearance of vitality. An actual germinating test is the only way in which the worthlessness of seed that has been treated in this manner can be disclosed.

Photo by J. H. Koehler.

SHOWING TWELVE SELECTED GINSENG ROOTS CULTIVATED FOUR YEARS. THE TOTAL GREEN WEIGHT OF THE ROOTS WAS 3 POUNDS, 13½ OUNCES; WEIGHT AFTER DRYING WAS 1 POUND, 4 OUNCES. THEY SOLD AT $10.00 A POUND OR $1.11 PER ROOT.

Next, the young roots are sufficiently delicate to demand careful individual handling. Inexperienced laborers handling the roots in a wholesale way are likely to injure them. These things are more likely to occur in the establishment of a seed and root dealer than in the garden of a practical and experienced grower. Again, buying from a practical grower established a relationship which will not only give the beginner the benefit of sound advice right at the outset of his enterprise, but will assure him of good counsel in times of emergency.

If any reader is inspired by the remarkable success of Mr. Koehler to enter the lists as a ginseng grower, he should not lose sight of the vital consideration that this man was temperamentally equipped to succeed where a thousand competitors would have failed. Probably the only safe advice to give any man who contemplates growing ginseng is that given to those about to marry: don't! And yet a few who have the money, the patience, the tact and the temperament will probably find rich rewards in it.

GOVERNMENT ANNOUNCES TERMS OF TIMBER SALE

THE Government plans to sell about 125,000,000 board feet of timber from the Booneville national forest, Wyoming. The timber will consist of the principal Rocky Mountain conifers—lodgepole pine, Engelmann spruce, Douglas fir, balsam fir, and limber pine, and lies on the main Wind River watershed.

A period of eight years will be allowed for the cutting, and a minimum price of $2.75 a thousand feet for saw logs, $1.50 a thousand for posts and mine timbers, and 8½ cents each for hewed railroad ties will be required. In accordance with the established practice of the forest service in long-term contracts for the sale of timber, there is provision for a readjustment of rates which may be put into effect when approximately half of the timber is harvested. It is announced, however, that this readjustment will not advance prices more than 50 cents a thousand feet above the minimum price which the Government asks in the first place. The announcement of this advance and its maximum amount, according to forest officers, works equally to the advantage of the seller and the purchaser. It allows the Government to get the benefit of a rise in lumber prices, and it makes clear to the purchaser not only that an advance may be made if conditions warrant, but just what the amount of that advance may be.

FOREST INSECT RAVAGES STOPPED

BY a prompt campaign against a flourishing colony of bark beetles on the Ochoco National Forest in central Oregon the Government is eliminating a danger which threatened to destroy millions of feet of timber.

In fighting this forest scourge the method recommended by the Bureau of Entomology is followed. The simple removal of the bark of infested trees between October and July, while the larvae are still in the tree, is sufficient to kill them. The lumber may then be sold while it is yet sound. On the Ochoco Forest, however, there was no market, and the forest officers found that the cheaper and more effective method of control was to cut the trees and burn them before the new broods of beetles could emerge. In 1912 the infestation was given a decided check by the cutting of 3,500 trees. This summer the attack on the insects was resumed with renewed vigor, and 42 laborers, in charge of a forest officer, cut more than 40,000 trees. As a result of these vigorous measures, the Government apparently has the beetles under control.

THE FOREST RESOURCES OF ALABAMA*

By Roland M. Harper, Ph. D., *Geological Survey of Alabama*

OVER three-fifths of the area of Alabama is still covered with forests, consisting of at least 125 species of trees, about 50 of which have been utilized to some extent for lumber. These forests yielded in 1909, according to the last census, nearly $24,000,000 worth of lumber and $2,500,000 worth of naval stores, not to mention vast quantities of fuel, cross-ties, fence-posts, etc., for which no reliable data are obtainable.

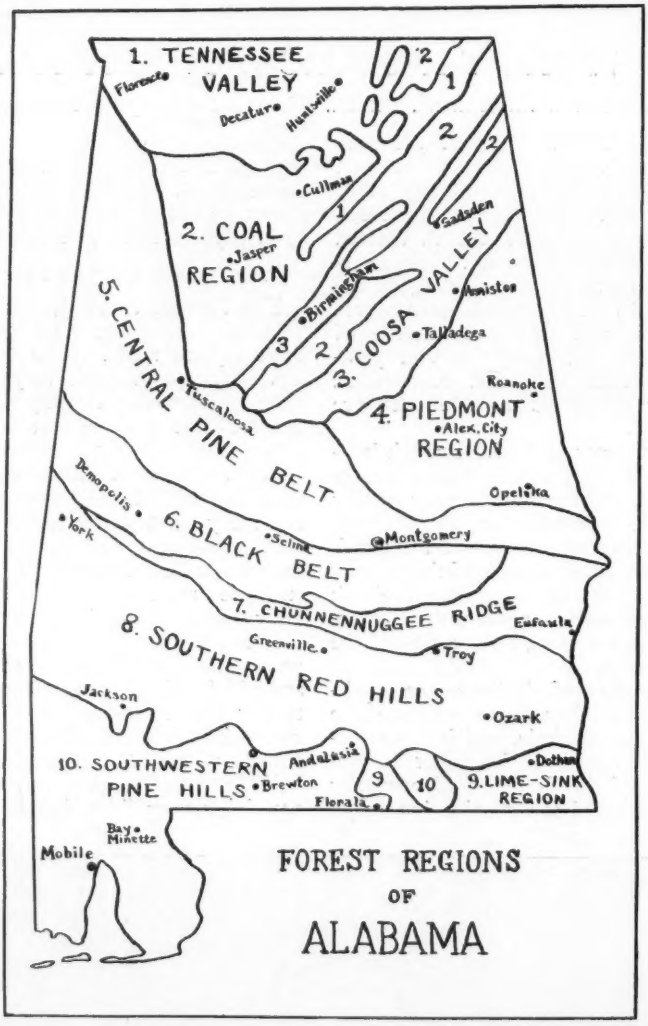
About 40 per cent of the rough lumber was further manufactured within the State, and its value thereby greatly increased. Pine of several kinds constitutes about nine-tenths of the rough lumber and seven-eighths of the finished lumber. Next in importance are oak of several species, poplar, sweet gum, hickory, tupelo gum, and cypress, in the order named.

The forests of Alabama are so diversified that they cannot very well be described as a whole, and it is expedient to recognize at least ten natural divisions of the State, based primarily on geology and topography, but easily characterized by differences in the composition and condition of the forests. These divisions, whose boundaries are shown on the accompanying map, may be briefly described as follows:

THE FOREST REGIONS DESCRIBED.

The Tennessee valley, including the "barrens" along the State line, cover 4,900 square miles. It is a more or less calcareous region, very fertile in most parts, comparatively level, and bordered on the south and east by mountains. The Tennessee River, which traverses it from end to end, furnishes water transportation throughout the year, and the region is pretty well supplied with railroads. The fertile soil led farmers to clear and cultivate most of the area at an early period in the State's history, and forests are now chiefly confined to the poorest and rockiest places; but they are still furnishing a greater variety of timber to the markets than any other region in the State. As in most other regions where forests occupy less than half the area, fire and domestic animals are doing very little damage; because

SLOUGH FULL OF TUPELO GUM, ABOUT A MILE FROM THE TENNESSEE RIVER IN LIMESTONE COUNTY, OPPOSITE DECATUR, IN THE TENNESSEE VALLEY, MARCH, 1913.



fires cannot spread far, and cattle and hogs in most parts of the region are required to be penned up so that cultivated fields will not have to be fenced.

This is the great cedar and hardwood region of the State. Long-leaf pine is entirely absent, and other pines comparatively scarce, though perhaps on the increase on account of their tendency to take possession of abandoned fields. The commonest trees at present seem to be red cedar, red oak (*Quercus falcata*, the "Spanish oak" of northern books), sweet gum (known as red gum in the lumber trade), short-leaf (loblolly) pine, sycamore, willow, scaly-bark hickory, and beech, approximately in the order named. Fifty-two sawmills are reported from this region by the *Southern Lumberman*, the average mill cutting 9,000 feet of lumber a day, of five or six kinds. The principal forest products are cedar posts and pencil stock, oak cooperage stock, oak cross-

LOOKING SOUTH ACROSS THE "GULF" ON SOUTHEAST SIDE OF CHANDLER MOUNTAIN, ST. CLAIR COUNTY, IN THE COAL REGION, FROM TOP OF A PERPENDICULAR SANDSTONE CLIFF ABOUT 100 FEET HIGH. SHOWS THE LEVEL SUMMIT AND STEEP SLOPE CHARACTERISTIC OF THE PLATEAUS OF THIS REGION.

ties, crates, and baskets from various woods, and hickory spokes and handles.

The coal region, which is the southwestern extension of the Cumberland plateau, embraces 6,400 square miles of hilly to mountainous country, with sandstone and shale rocks of Carboniferous age and comparatively poor soils. The population is sparse—though increasing pretty rapidly, as in many other sandy regions in recent years—and almost as many persons are engaged in coal mining as in farming. About three-fourths of the area is still covered with forests, which have never been exploited very actively by lumbermen, chiefly on account of the topography, which has retarded the building

LOOKING DOWN GORGE OF LITTLE RIVER ON LOOKOUT MOUNTAIN FROM CREST OF THE LOWEST FALLS, EAST OF FORT PAYNE AND ABOUT TEN MILES BELOW DESOTO FALLS, IN THE COAL REGION. SHOWS THE RIGHT OR DEKALB COUNTY BANK.

BIG SANDY CREEK AT DADEVILLE POWER-HOUSE SHOALS, SOUTHWEST OF DADEVILLE, TALLAPOOSA COUNTY, IN THE BLACK BELT. ONE LONG-LEAF PINE (*PINUS PALUSTRIS*) IN MIDDLE OF SHOALS, AND MANY MORE ON NEIGHBORING HILLS. (THIS TREE, ORDINARILY CONFINED TO THE DRIEST SOILS, CAN BE FOUND IN SIMILAR SITUATIONS IN MID-STREAM AT SEVERAL PLACES IN THE TALLAPOOSA RIVER AND ITS TRIBUTARIES.)

of railroads. The commonest trees are two short-leaf pines (*Pinus Tadea* and *P. echinata*), cliff or spruce pine (*P. Virginiana*), post oak, red maple, beech, white oak, chestnut oak, red oak, sweet gum, poplar (*Liriodendron*), and dogwood. There are 24 sawmills, the average one cutting about three kinds of timber, at the rate of 9,600 feet a day. The leading forest products are short-leaf pine lumber, oak and chestnut cross-ties, fuel and charcoal, mine timbers, chestnut poles and posts, cooperage stock, staves and handles, and tanbark, the last mostly from chestnut oak. The lumber production will probably increase considerably within the next decade, partly because the growing population will bring about better transportation facilities and partly because the more accessible timber in other parts of the State is getting scarcer.

The Coosa Valley region, covering 4,000 square miles, is similar to that of the Tennessee in many ways, but has greater diversity of soil, and more mining and manufacturing. Counting in the manufacturing cities the population is denser than that of the Tennessee valley, but outside of the cities it is a little sparser, and consequently the forests are more extensive, covering about 55 per cent of the area. The region is well supplied with railroads, most of them radiating from Birmingham, Alabama's largest city.

The commonest trees are short-leaf pine (two species), long-leaf pine, sweet gum, post oak, red oak, and black-jack oak, each of which makes up at least 4 per cent of the total forest wealth. There are 69 sawmills, with an average capacity of 12,000 feet a day, most of them cutting three or four kinds of wood. The principal forest products are lumber from the three pines named, and the same worked up into various kinds of building material,

such as shingles, laths, flooring, doors, sash, blinds, and interior finish. Another important item is charcoal. Three or four of the numerous iron furnaces in the region use charcoal for fuel, at the rate of about eight million bushels a year, equivalent to some 150 million feet of lumber. A good deal of this, however, is hauled in from other regions. Next in importance are post oak and long-leaf pine cross-ties, cooperage stock, baskets, crates, furniture, wagons, freight cars, handles, spokes, and chair stock.

The Piedmont region, including the Blue Ridge on its northwestern border, covers 5,450 square miles. Its soils, derived from ancient crystalline rocks, are mostly reddish and clayey, and moderately fertile, but much of the area is a little too hilly or rocky for profitable cultivation, and forests are estimated to cover 57 per cent of it. There are about 40 inhabitants to the square mile, two-thirds of them white. The streams are not navigable, but they furnish abundant water-power, which is now being "developed" on a large scale in several places.

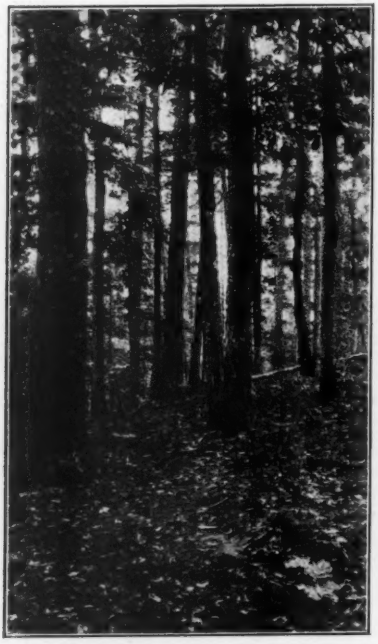
The commonest trees are long-leaf pine (this mostly on and near the Blue Ridge), short-leaf pine (both species, as usual), sweet gum, poplar, black-jack oak, post oak, red oak, red maple, dogwood, and bay (*Magnolia glauca*), in the order named. For various reasons lumbering is a less important industry here than the raising and manufacturing of cotton. There are 54 sawmills, mostly small ones, with an average capacity of 7,500 feet a day. The forest products are of the commoner sorts.

The central pine belt, covering 7,450 square miles, is moderately hilly, a little rocky in places, with poor to moderately fertile soils resting on Cretaceous strata. It is a part of the coastal plain which borders the coast from New York to Texas and beyond. The population is not very dense yet—about 30 inhabitants to the square mile—but it is increasing faster than in most other parts of the State. About 75 per cent of the area seems to be still wooded, but of course most of the forest has been cut over more or less.

The list of trees is a long one. The commonest species are short-leaf (loblolly) pine (*Pinus Taeda*), ordinary short-leaf pine (*Pinus echinata*), long-leaf pine, bay (*Magnolia glauca*), sweet gum, beech, poplar, red maple, water oak, whie oak, post oak, and red oak. The pines make up 30-40 per cent of the present stand of timber, and

SCENE ON CEDAR MOUNTAIN, A SPUR OF THE BLUE RIDGE NEAR PYRITON, CLAY COUNTY, LOOKING NORTHWEST TOWARD THE MAIN RIDGE. IN THE FOREGROUND ARE OUR LONGEST AND SHORTEST LEAVED PINES (*PINUS PALUSTRIS* AND *P. VIRGINIANA*, WHICH DO NOT ASSOCIATE IN MANY PLACES, BECAUSE ONE LIKES FIRE AND THE OTHER DOES NOT), AND CHESTNUT OAK.

17 species of oak about 20 per cent. Lumbering is still, and probably will be for some years, one of the leading interests of the inhabitants; and this region, with less than 15 per cent of the area of the State, now produces over 30 per cent of the lumber. There are 165 sawmills, with an average capacity of 17,500 feet a day, cutting three or four kinds of wood each. The forest products are of the usual kinds, rough lumber and cross-ties predominating.



DRY WOODS AMONG LOW HILLS ABOUT SIX MILES EAST OF TUSCALOOSA, IN THE CENTRAL BELT. TREES MOSTLY SHORT-LEAF PINE (*PINUS ECHINATA*), THE NEAREST ONE 20 INCHES IN DIAMETER. A LITTLE TO THE RIGHT OF IT IS A CHESTNUT OAK.

Some "naval stores" (i. e., turpentine and rosin) are made from the long-leaf pine in the southern half of the region, but this industry is much less prevalent than it is nearer the coast.

The black belt takes its name from the color of some of its soils, in contrast to the reddish soils of neighboring regions, and not, as is sometimes supposed, from the color of the majority of its present inhabitants. It is also known as the cane-brake or prairie region. It has an area of 4,300 square miles in Alabama, coinciding closely with the outcrop of the Selma Chalk, one of the Cretaceous formations. This weathers into calcareous clayey soils of exceptional fertility, which, however, become very dry in summer and are almost impossible to plow or even haul wagons over in wet weather. In ante-

SWAMP OF BIG CREEK, ABOUT FOUR MILES WEST OF NORTHPORT, TUSCALOOSA COUNTY, IN THE CENTRAL BELT. TREES MOSTLY CYPRESS AND TUPELO GUM.

bellum days, when commercial fertilizers were almost unknown and sandy soils were considered worthless, most of the forests of the black belt were cleared away by the farmers, and this became the most thickly settled region of the State. But when it was found that the sandy soils farther south, easily tilled in any kind of weather, yielded handsomely when properly fertilized, there was something of an exodus from

the black belt, which by that time had about as many farmers as it could well accommodate. The population is a little less now than it was a decade or two ago, but in 1910 there were still 49 persons to the square mile, which is above the State average.

Forests are at present chiefly confined to swampy bottoms and poor ridges, estimated to make up about one-fourth of the total area. Some parts of the region indeed are said to have been treeless when the country was first settled (whence one of the names), but it is impossible to make any estimate of the extent of the original prairie spots now, or even to locate many of them, for they have been almost entirely obliterated by cultivation. The commonest trees are sweet gum, short-leaf (loblolly) pine, post oak, hackberry, red oak, willow oak, and cedar. Only about 20 per cent of the trees (individuals, not species) are evergreen, a figure which is considerably below the State average, and doubtless correlated with the fertile soil and dry summers.

The lumber industry is quite diversified, as in the Tennessee valley, but relatively unimportant, on account of the limited extent of the forests. There are 22 sawmills, with an average capacity of 13,400 feet a day; but the latter figure would be much lower if timber brought in from other regions could be excluded from the computation, for some of the largest mills get most of their supply by rail or water from the well-wooded central pine belt a little farther inland. Each mill cuts nearly five kinds of wood, on the average, and there are more cutting cottonwood, hackberry, sweet gum, and tupelo gum here than in any other part of the State.

STEEP HILLSIDE WITH VIRGIN FOREST OF LONG-LEAF PINE AND A LITTLE DOGWOOD, NEAR NORTHEASTERN CORNER OF HALE COUNTY, IN THE CENTRAL BELT.

LONG-LEAF PINE AND TURKEY OAK (*QUERCUS CATESBAEI*, AT LEFT) ON A HIGH ROCKY HILL ABOUT A MILE SOUTH OF PEARSON, TUSCALOOSA COUNTY.

The Chunnennuggee Ridge or bluemarl region, 2,300 square miles in extent, is a little more hilly and sandy and

BLUE POND, A LARGE LIME-SINK HOLDING WATER, IN PINE FORESTS IN SOUTHWESTERN PART OF COVINGTON COUNTY, IN THE WIRE GRASS REGION.

less fertile than the black belt, but otherwise similar. There are about 41 inhabitants to the square mile, mostly negroes, and the population has decreased a little, as in the black belt. Forests seem to cover about half the area, but much of the woodland is second growth and not very dense. The commonest trees seem to be short-leaf pine (both species), long-leaf pine, sweet gum, willow, bay, spruce pine (*Pinus glabra*), water oak, red oak, and cottonwood. There are 24 sawmills, with an average capacity of 10,400 feet a day; but the largest one gets most of its timber from the region lying just to the southward, and if it were left out of the calculation the average daily capacity would be only 8,700 feet. A minor forest product from this region is evergreens for Christmas decorations.

The southern red hills region, including two narrow belts along its edges, namely, the post-oak flatwoods on the north and the lime hills on the southwest, covers about 9,635 square miles. The topography varies from level to almost mountainous, and the soils, derived from Tertiary formations, are varied, but mostly reddish loam, moderately fertile and easily tilled. Agriculture has been long established, but there are enough hilly and swampy places and others which have been left in forest for one reason or another to make up about 62 per cent of the area. In 1910 there were about 32 inhabitants to the square mile.

The commonest trees are short-leaf (loblolly) pine, long-leaf pine, sweet gum (ordinary), short-leaf pine, magnolia, bay, spruce pine, dogwood, red oak (*Quercus falcata*), water oak, and poplar, approximately in the order named. There are 95 sawmills, with an average daily capacity of 16,900 feet, cutting about three kinds of wood each. In some of the counties considerable quantities of branches or sprouts of magnolia, holly, and long-leaf pine, and

TURPENTINE STILL IN THE LIME HILLS NEAR FRANKVILLE, WASHINGTON COUNTY, IN THE RED HILLS. ROSIN BARRELS AT LEFT, FUEL AT RIGHT. THE LIMESTONE CHIMNEY IS VERY CHARACTERISTIC OF THIS REGION, BUT VERY UNUSUAL FOR A TURPENTINE STILL, THE VAST MAJORITY OF WHICH ARE IN REGIONS WHERE NO SUCH ROCK IS TO BE HAD.

such evergreen shrubbery as palmetto, wild smilax, and mistletoe are shipped North for decorative purposes in fall and winter. The naval-stores industry is carried on wherever the long-leaf pine is abundant enough, but on a smaller scale than in the regions nearer the coast.

The lime-sink or wire-grass region, embracing 1,350 square miles in the southeastern corner of the State, is comparatively level, with sandy and loamy soils underlaid by limestones, considered almost hopelessly sterile a few decades ago, but now in great demand for agricultural purposes on account of ease of cultivation. In 1910 there were about 50 inhabitants to the square mile (over three-fourths of them white), an increase of nearly 60 per cent in ten years.

This region was originally covered mostly with open park-like long-leaf pine forests, but the farmers have reduced the forest area to about 60 per cent, and the lumbermen have reduced the stand of pine to about 35 per cent of the present forests. Other common trees are short-leaf pine (*Pinus Taeda*), slash pine (*Pinus Elliottii*), pond cypress (*Taxodium imbricarium*), turkey oak (*Quercus Catesbaei*), black gum (*Nyssa biflora*), bay (*Magnolia glauca*), and upland willow oak (*Quercus cinerea*), each of which is estimated to make up at least 3 per cent of the forests. Only ten sawmills are now reported from this region, with an average capacity of 9,300 feet a day. All cut long-leaf pine, and most of them cut little else. Besides lumber the only forest products of much importance are shingles, cross-ties and naval stores. Pine wood is almost the only fuel used for domestic purposes.

The southwestern pine hills, including two small and practically uninhabited regions adjoining the Mobile delta and the coast strip, has an area of about 5,550 square miles. The topography is undulating to flattish, and the numerous streams arising within the region are either clear or coffee-colored, never muddy. The soil is rather sandy, with a clay subsoil, not at all calcareous or specially fertile, but very easily tilled.

Forests still cover about four-fifths of the area, but they have been severely culled by lumbermen and are now rapidly disappearing before the axe of the farmer, as the merits of sandy soil are appreciated much more now than they were a few decades ago. Excluding the city of Mobile, which has been built up largely by foreign trade, there were only about 10 inhabitants to the square mile in 1900 and 15 in 1910. The region has many advantages in the way of mild climate, pure water, responsive soil, etc., and the population is likely to continue to grow very rapidly for some time to come.

TURPENTINE NEGRO AT WORK IN A LONG-LEAF PINE FOREST A FEW MILES NORTH OF BAYOU LA BATRE, MOBILE COUNTY, IN THE PINE HILLS. TREES "BOXED" IN THE OLD BARBAROUS WAY, FOR THIS WAS BEFORE CUPS AND GUTTERS WERE INTRODUCED IN ALABAMA. PHOTOGRAPHED IN 1902.

SHORT-LEAF PINE (*PINUS TAEDA*), TWO FEET IN DIAMETER, WITH FIVE SCARIFIED FACES FOR THE PRODUCTION OF TURPENTINE, IN THE LIME HILLS BELT ABOUT TWO MILES NORTH OF MILLRY, WASHINGTON COUNTY. THIS TREE IS BEING WORKED BY THE MODERN CUP-AND-GUTTER METHOD. THE ATTEMPT TO EXTRACT TURPENTINE FROM SHORT-LEAF PINE IS RATHER UNUSUAL, AND PROBABLY NOT VERY SUCCESSFUL.

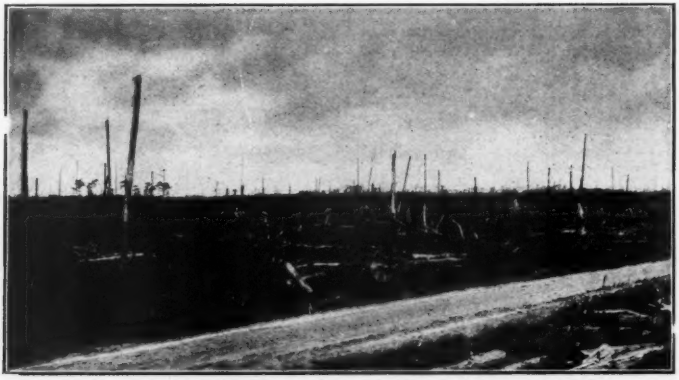
This is the great long-leaf pine region of Alabama, that tree constituting about 70 per cent of the original forests and 50 per cent of the present stand of timber. The trees next in abundance are slash pine, pond cypress, short-leaf (loblolly) pine, black gum, turkey oak, black-jack oak, and bay. Over 80 per cent of the trees are evergreen, so that the forests do not look very different in winter from what they do in summer. There have been reported 62 sawmills, with an average daily capacity of 37,100 feet, which is more than double the size of those of any other region as here defined. The largest claims to cut 275,000 feet a day, and it controls enough timber to keep it going for many years. Nearly all the mills depend almost entirely on long-leaf pine (and slash pine, which is not usually distinguished from it by lumber and turpentine men). These mills together operate 424 miles of logging railroad, which is just about as

VIRGIN FOREST OF LONG-LEAF PINE, ABOUT 25 MILES SOUTH OF BAY MINETTE AND 10 MILES OF FAIRHOPE, BALDWIN COUNTY, IN THE PINE HILLS. PHOTOGRAPHED IN 1902. THESE TREES HAVE PROBABLY BEEN CUT BY THIS TIME.

much as in all the rest of the State combined. The turpentine industry is an important one in this region also, but no statistics of it for areas smaller than the whole State are available. The same might be said of cross-ties, poles, posts, shingles, and a few other forest products. Pine wood is still used a good deal for locomotive fuel, mostly on logging railroads, but also on a few lines which carry passengers.

FIRE IN LONG-LEAF PINE FORESTS.

It has been known that the long-leaf pine, the most useful and originally the most abundant tree in Alabama



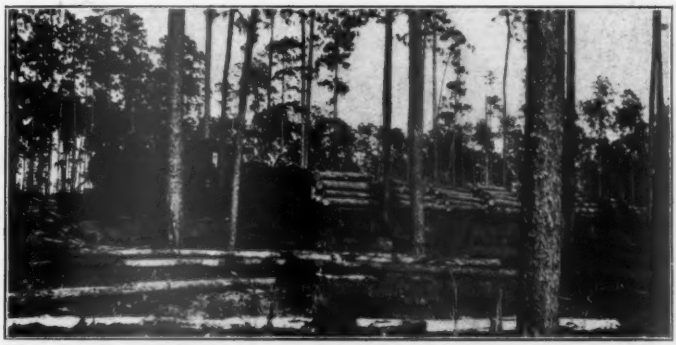
A SCENE OF DESOLATION ABOUT FOUR MILES SOUTHEAST OF GRAND BAY STATION, MOBILE COUNTY. CUT-OVER LONG-LEAF PINE LAND WITH ALMOST NO SIGNS OF A SECOND CROP OF TREES. JUNE, 1912.

and some adjoining States, withstands fire better than almost any other tree, but very few persons seem to have realized that fire is well-nigh essential to its exxistence. In the dense coniferous forests of the northermost States and Canada a forest fire usually means the destruction of a large amount of timber and often of other property as well, and it is therefore looked upon as a calamity, to be averted by all possible means. In the Middle States forest fires are not very destructive to standing timber, but they burn up the humus and thus impoverish the soil, which is another reason why most writers on forestry regard fire as one of the greatest enemies of the forest.

Different types of forest vary greatly in their relation to fire, however, and some can stand much more frequent fires than others. In the northern coniferous forests fire perhaps does not visit any one spot more than once in the lifetime of a tree, on the average, while most of the long-leaf pine forests, even the scattered bodies of this pine among the mountains, are now burned over nearly every year. A fire in a long-leaf pine forest is practically always a ground fire, feeding upon the pine needles and dense herbage, and doing little or no damage to mature and sound trees, for their bark is thick and practically fireproof, and their branches are all high up out of the reach of flames. Such fires do, of course, burn up the humus, which the pine seems to have little use for, but at the same time, they return immediately to the soil the mineral plant food stored up in the dead leaves. The amount of available plant food in the soil of the pine forests is usually rather limited, and these frequent fires thus enable the pine to do business on a small amount of capital, as it were.

If the herbage was never burned off, most of the pine seeds, which are very light, would lodge in the grass and fail to germinate, and at the same time, oaks and other hardwoods would take advantage of the enriched soil and invade the pine forests, ultimately making enough shade to prevent the reproduction of the pine, which is eminently an intolerant or light-demanding tree. Proof of this can be seen in many places in the long-leaf pine regions, where bluffs too steep for fire to descend readily, or peninsulas between two streams, with soil originally the same as in the pine forests, are now covered with shady hardwood forests, commonly known as hammocks.

Fire must have been started in the pines by lightning or other natural causes very often in prehistoric times, otherwise the long-leaf pine could not have maintained itself against the encroachments of the hardwoods. At present, of course, most of the fires are set by human agency, either purposely



MODERN LOG-TRAIN APPROACHING SAWMILL. THE LOGS ARE PROBABLY ALL LONG-LEAF PINE, AS ARE THE STANDING TREES. JULY, 1911.

or accidentally. Stockmen burn off the dead grass to facilitate grazing, and turpentine operators for another reason. In the regions where long-leaf pine is the most abundant tree most of the trees are now tapped for turpentine, each thus presenting several square feet of very inflammable material within easy reach of ground fires. When fire comes in contact with such a tree it not only destroys several weeks' accumulation of gum, but also seriously injures the tree, sometimes killing it. To guard against this the turpentine men every winter chop away the grass for a few feet around each tree that is being worked, and then set fire to the woods; the idea being that the oftener the grass is burned the less combustible material there will be each time, and therefore the less danger of setting fire to the trees. If the burning is done in winter, and especially when the ground is damp, the danger is reduced to a minimum.

Probably no tree, not even the long-leaf pine, can reproduce itself where fire sweeps over the ground every year; but this pine at the age of four or five years, if not earlier, becomes practically immune to fire, so that any suitable spot which escapes burning for a few years is likely to become covered with a thicket of young pines, which thin themselves naturally as they grow older. And even if the opportunity for seedlings to grow should come but once in fifty years on any particular piece of ground, that would be sufficient to perpetuate the forests. This noble tree is holding its own remarkably well, too, in spite of too frequent fires and other inroads of civilization.

In view of the above facts, while it might be well for the conservationists to continue their efforts to discourage the wilful burning of the pine woods, the accidental fires need not cause any apprehension, for they probably come just about often enough to protect the pine from the encroachments of the hardwoods, most of which are much less valuable for timber. Although the increase of population tends to increase the number of forest fires, it also restricts the area over which each conflagration can spread, by providing more roads, railroads, clearings and other barriers. The prevalence of fire in the western prairies has been greatly diminished by the extension of settlements, and the same thing will doubtless come about in the long-leaf pine regions, independently of any conservation campaign.

CONCLUSION.

In Alabama, as in many other States, the forests are being cut faster than they are growing, without much heed for the future, and yet the time predicted for their exhaustion keeps receding; partly because of the increasing use of substitutes for wood in the building trades and the more econom-

SCENE AMONG DUNES SOUTH OF ORANGE BEACH (ABOUT OPPOSITE WEST END OF FLORIDA), LOOKING EAST ACROSS OUTLET OF PERDIDO BAY. TREES IN FOREGROUND MOSTLY SCRUB LIVE OAK (*QUERCUS GEMINATA*). A FEW SLASH PINES IN THE DISTANCE.

ical utilization of stumpage, and also partly because some of the trees, especially the pines, have greater reproductive powers than the prophets have allowed for. Although there are many abandoned sawmills here, as elsewhere, the opportunities for profitable lumbering by conservative methods are probably as numerous as they ever were. As the supply of timber diminishes the price increases, and small mills are now working with profit on material that the large mills of the last decade passed by. With 62 per cent of the area of the State still wooded, the forests promise to remain one of Alabama's most valuable assets for many years to come.

* This is in the main an abstract, prepared by the author, of Monograph 8 of the Geological Survey of Alabama, a 228-page report published in June, 1913. The remarks on fire in the long-leaf pine forests have been somewhat elaborated at the suggestion of the editor, because they embody a point of view which will probably be new to most northern readers. (In this connection see the *Literary Digest* for Aug. 9, 1913, page 208.) All the half-tone illustrations are taken from the above-mentioned report, the cuts having been loaned by the Survey.

NEW PLANTS DISCOVERED IN STUDY OF GRAZING LANDS

IN making a study of grazing lands on the national forests, 125 entirely new species of plants have been discovered by the Government's experts, and will be named and classified by the botanists of the Department of Agriculture. Their discovery came about through the collection of some 9,000 different plant specimens, with notes as to their habits of growth and forage value. This work is part of a comprehensive plan to determine the grazing value of every acre of national forest land, in which the capacity of the soil to grow certain forage crops is to be determined and an effort made to decide for which class of stock—sheep, cattle, or goats—the range is best suited.

As a result of the study, the forest service announces that it will be in a position to perfect its system of grazing management to bring about still better conditions for both stock and range.

THE LUMBER INDUSTRY

By R. C. Bryant, *Professor of Lumbering at Yale College*

[This is another of a series of articles on the lumber industry by Prof. Bryant. In it he tells of the various organizations for trade promotion and a better business direction of the industry, and very clearly shows how foolish is the impression, doubtless still prevalent in some quarters, that there is now or has been in the past, a lumber trust. Prof. Bryant speaks particularly of the value of trade discussion.—The Editor.]

LUMBERING is one of the foremost industries in the United States, not alone from the standpoint of the amount of capital invested, but also from that of the number of persons employed and the value of the final product. It is natural, therefore, that the individuals engaged in the manufacture and sale of forest products should develop the trade association idea to a wide extent.

The organizations representing the different phases of the industry are many and varied, namely, the timberland owners in some sections, especially in the Northeast, Lake States and the Pacific Northwest, have perfected associations for the protection of their standing timber from fire; the loggers in the Northwest and the South have their logging Congresses, and the manufacturers, wholesalers and retailers have their organizations which represent their interests, the men connected with more than one line of work often being members of two or more groups. Finally the chief manufacturers' associations are allied in a National Manufacturers' Association which represents the interests of the lumber industry at large. The various organizations, with the exception of the latter, are either sectional in character or else bounded by the limits of one State or a few adjoining ones.

In addition to those mentioned, there are many associations which represent various side lines, such as lumber exportation, veneer manufacture, box manufacture, and other minor industries.

FOREST PROTECTIVE ASSOCIATIONS.

The forest protective associations which have been mainly established during the last five years usually support paid secretaries, and forces of fire fighters who patrol the lands of members, during the danger season, and take the initiative in preventing and also in fighting fires. Associations of this character are supported by an acreage assessment made against each member. These associations have not only proved a highly profitable form of endeavor for timberland owners, but also have been a great boon to the country in creating a more sane attitude toward the forest fire problem, through the educational campaigns conducted by them and through the effective fire preventive measures they have introduced; and also by the saving from fire of timber worth millions of dollars.

The operators in the southern and southeastern part of the United States have been slow to adopt the measures found so advantageous in some other sections, largely because forest fires have not damaged the standing timber to as great an extent. Action has been further delayed because of the impression held by many land owners in this part of the country that the annual burning of the litter on the forest floor is not an evil but rather a necessity for the protection of the standing timber. The soil in these regions is chiefly mineral, the ground cover often being burned each year. However, if fires in the South do not destroy each season's litter, the deposit which accumulates, during a few seasons, makes a hot fire which will destroy more or less mature timber. The annual ground fires, however, do far more damage than most operators imagine, not only destroying some mature timber, but also the small growth over large areas.

An example of the injury a light ground fire may inflict in southern pine

forests was observed in southern Arkansas, where several hundred thousand board feet of merchantable timber was killed by fire in November, 1912.

The problem of handling the fire question in the South is still a mooted one, and until some form of management is devised that timberland owners will adopt, forest protective associations will find little favor.

LOGGING CONGRESSES.

The organization of loggers' congresses is a comparatively new field of association effort; but one for which there is great need and in which the possibilities are almost unlimited. The first important logging congress in the country was organized in Seattle in July, 1909, and comprised the loggers of the Pacific Northwest. This congress has proved of inestimable value to the logging interests which it represents and bids fair to be one of the most important factors leading to the development of a high efficiency in the logging industry. It has not alone confined its efforts to the improvement of methods, but is making important strides in solving the labor problems and in securing the highest efficiency from the woodsmen.

It has been one of the prime factors in the development of the new profession of logging engineering and is giving active support to certain educational institutions which are desirous of aiding in the training of young men for the higher positions in logging work.

A congress was also organized among the southern loggers in September, 1911. The hopes of the promoters of this congress have been more than justified in the results already accomplished and the organization gives promise of being a great aid to the lumbermen of the South in the standardization of logging methods and the introduction of the most approved methods of operation.

LUMBER MANUFACTURERS' ASSOCIATIONS.

Lumber manufacturers, who in most parts of the country are also loggers, have for many years had associations. These are largely concerned with the problems of uniform manufacture, sale of lumber and similar lines of effort, rather than with the problems of logging. As a rule, these associations represent a given species of timber, or the industry in a given region. The members of the larger associations have also, in some instances, organized smaller organizations which handle the problems of concern to operators in their limited field, and which do not apply to the business of the entire membership.

The majority of the membership of these associations is composed of the larger operators, since they usually have a broad viewpoint concerning the problems of the industry and often the entire time of the owner is devoted to the business. There are, however, in every region some large operators who, for various reasons, have not allied themselves with any organization of lumbermen. The thousands of small operators in every region seldom join such an association since lumber manufacture is frequently not their sole occupation; their methods of manufacture are often unsatisfactory and not up to association standard; and further they would usually feel the burden of the expense of membership in such an organization. The small operators benefit individually, however, from the work of the association and, as a rule, the practices of the large operators are followed as closely as possible by the smaller ones.

The organizations with the largest membership do not, so far as known, represent in any case one-half of the annual output of the particular species or region which they represent.

The fundamental reason for the formation of lumber manufacturers' associations are the same as those prevailing in every industry. As competition, both for the raw and manufactured articles has become more keen and business methods more complicated, necessity has forced operators to unite since there are many phases of work which can be performed and

many reforms which can be brought about only through co-operation.

These associations have proved of great value in solving many problems of the industry, and the sessions have afforded an opportunity for lumbermen to discuss many phases of their business which has led to improved methods of handling timberlands, and more efficient logging and manufacturing methods.

At an early period in the history of lumber manufacturers' associations there was some attempt made by a few local associations to regulate the sale of the product manufactured by its members, but where this was the case the organizations seldom survived more than one or two years, because of the impossibility of holding members to any form of price agreement.

EDUCATIONAL ASSOCIATIONS.

The chief function of lumber manufacturers' associations today is educational in character. The larger ones support salaried secretaries and require large office forces to transact their business. Previous to the organization of such associations the manufacture of lumber was conducted in a free-for-all manner so far as standard products were concerned, and even today there is variation in certain regions. For instance, four different patterns of flooring were formerly manufactured by the mills in the yellow pine region of the South and were sold in the same markets. These patterns varied in size by small fractions of an inch and also slightly in form so that a buyer could not use the different patterns on a single floor. This led to endless confusion on the part of the buyer since he usually found it desirable to secure his lumber from various sources. The desirability of having flooring manufactured to a standard pattern was appreciated by all manufacturers, but as individuals it was impossible for them to bring order out of chaos. It was only when association meetings afforded a common ground for the exchange of ideas that an adjustment of the matter was made.

RULES FOR GRADING LUMBER.

Another important function of manufacturers' associations is the establishment and maintenance of fixed rules for grading lumber. The early manufacturer usually sold his lumber "mill run"— that is, the entire cut of the mill, for a uniform price, or else he sorted it into a very few grades. The lumber before it reached the consumer was usually assorted still more closely. However, much good material was used for many purposes where a lower grade would have answered fully as well. As the demand for lumber increased and the price became higher the standards of consumers fell and they sought a quality which would still meet their needs and yet be low in price. This led to the classification of lumber into more grades, a process which is still taking place today with some of the cheaper woods.

The printed grading rules on which the separation of lumber into grades is based are not absolute, because of the wide diversity in the character of individual boards. Much must, therefore, be left to the judgment of the grader in the interpretation of the rules, which are of little value unless interpreted according to some uniform standard. Since the judgment of most graders is not uniform, endless confusion would result in the markets where the products of many mills are sold. To secure uniformity, associations maintain traveling inspectors who periodically visit the mills of association members, examine the graded lumber, point out misinterpretations on the part of the mill graders and give such instructions as are necessary to secure uniformity, throughout the region, in the classification of the product. This is of vital importance both to the reputation of the individual operator and also to the good name of the product in the markets. Inspection work is also extended by some associations to the investigation of complaints made by retailers and other buyers against shipments made to them by association members.

Another important association func-

tion is the collection and dissemination of information in regard to market conditions. This furnishes the operator with a trade barometer which is of inestimable value to him, since he is kept posted on the available supply and demand of the product he has for sale. He is, therefore, enabled to avoid overloaded markets and to seek out those where the demand is greatest.

PRICE REGULATION IMPOSSIBLE.

There is possibly an idea prevalent that lumber trade associations, through market reports and other means, attempt to regulate the price at which lumber is sold. Even if price regulation were feasible or desirable, it would be possible only by the concerted action of operators who manufactured a majority of the product. Since any given association does not represent even 50 per cent of the cut of a given region or a particular species it is manifest that any scheme of price regulation is not possible, even though it might have some trade advantages, which so far as the lumber industry is concerned, it does not have.

There are many reasons why price regulation could not be a success in the lumber industry. There is probably no form of business in the United States which is conducted by as many individual and separate operators as the lumber industry. Concentration of lumber manufacturing interests has taken place only to a very limited degree. Even the largest of the consolidated concerns represent only a small fraction of the total annual cut.

According to the census reports, there are more than fifty thousand lumber manufacturing plants in the country and the many diversified business interests of the individuals owning them forms an insuperable obstacle to any price regulation. It has been impossible for some of the strongest associations to secure uniformity of action on problems far more simple than price regulation, and if such is the case it is hardly plausible that concerted action could be secured on the larger problem of prices about which there is a market difference of opinion.

Price regulation could only be effected by the common consent and assistance of a far larger body of manufacturers than is contained in any one association and it would be impossible to secure the co-operation of one association with another since in every case they are business rivals.

A uniform price for given periods would be necessary for the control of values and this has some features so undesirable from the standpoint of the operator that it would be quite impossible to enforce. Among these may be mentioned the inability of an operator to move stock which was slow in the market, at a price below the uniform standard. This practice is often desirable or necessary on the part of a manufacturer in order to secure funds to meet outstanding obligations. Further, it is sometimes possible for an operator to secure a bonus for quick delivery of given stock. The acceptance of such an offer would, however, compel the operator to ignore the price agreement, in which case he would infringe upon the price-making power of the association. Thus in either of the above cases a uniform price would be undesirable from the individual's financial standpoint and it is not probable that he would abide by any agreement that was a distinct disadvantage to him.

Lumber prices are based upon supply and demand and can not be regulated in any other manner, at least while the industry is represented by such a large number of individuals. There may be times when the market is influenced by conditions outside the supply and demand, but such cases are rare and have but little lasting effect.

LUMBER SALES PLAN.

Lumber is sold from the mill in one or more of several ways. A large operator usually maintains a sales department and sells his product direct to the wholesaler, retailer or large consumer. Others sell through agencies or exchanges, or through commission men. The price received for a given grade of lumber in a particular market is not uniform, for there are several

factors that tend to create a difference in the value received. The financial resources of the manufacturer influence the price at which he is willing to sell his product. If he is continually pushed, to meet his obligations, he will usually be found offering his product at a slight discount below normal values in order to make a quick sale and realize on his product. On the other hand, manufacturers whose credit is ample are not forced to sell and often hold their product until the desired price is secured. This practice is frequently resorted to during periods of business depression by those operators whose financial status permits of this course of action.

Small operators, because of their limited output are unable to maintain a sales agency for marketing their product and, therefore, are usually forced to dispose of their product at a price somewhat below that received by the larger operator. A further factor which has a strong influence on the price received for the product from small mills is that the lumber is frequently poorly manufactured and seasoned and therefore is not saleable at as high a price as the product of larger mills. Some large mills acquire a reputation for marked excellence in manufacture, or their stumpage proves especially adapted for certain purposes. In such cases, the output of these mills commands a premium among the general trade.

A very important element in fixing the sale price of lumber is the ability of the sales manager of the individual plants. Those with an especially keen sense of values and with the power of seeking out and developing new and special uses for the mill output are often enabled to secure a substantial increase in the selling price over salesmen with less ability. Buyers of this class of lumber often pay higher prices for the product they require when it is manufactured according to specifications, which can often be done at little or no additional cost to the manufacturer.

EXISTENCE OF COMPETITION.

An examination of the average sales price for a given grade of lumber which is marketed, during any one month, by a group of mills situated in the same vicinity will very rarely show prices that are similar because all are competitors for the trade and each develops the markets which appeal to him the most. Even a group of mills in one vicinity which are controlled by the same interests seldom receive the same average price for a given grade of lumber if the sales departments are handled separately, as they sometimes are. The average price per thousand board feet received for the product may be similar, but even this is often not the case, due to a difference in the quality of the timber, the character of the manufacturing facilities, and the management.

Other features of association work are the conduct of advertising campaigns in the interest of the wood the association represents, including newspaper and magazine literature, and expositions to exploit the varied uses of the wood.

Some associations also publish a list of arbitrary prices for lumber which is used as a basis in the quotation of lumber prices. This list, like similar ones issued by other industrial organizations, provides a convenient and uniform basis from which discounts are made. It, however, bears no definite relation to the actual "going" price of lumber. The association has no connection whatever with the discounts which are made from the list by the various lumber companies.

Numerous other lines of work are undertaken by the various associations as the needs of the majority of the members dictate.

NATION-WIDE ASSOCIATION.

There are certain subjects which are of nation-wide interest to lumbermen and concern all sections of the country. In December, 1902, a National Lumber Manufacturers' Association was formed to handle such problems. This body is composed of delegates drawn from nearly all the sectional as-

sociations. Among the functions of this association, as stated in the constitution, are the following: The promotion of uniformity in the methods of manufacture and sale of lumber; the gathering and dissemination of reliable statistics showing the annual production and consumption of the various kinds of lumber manufactured in this country; the gathering, compilation and distribution of information as to general trade conditions in lumber and kindred interests throughout the country; the discussion of any and all questions of mutual interest that are national in their character and application; and the promotion of more friendly relations among those engaged in the lumber business. It has been the chief mouthpiece for the lumber industry on the subjects of the lumber tariff; forestry and forest education; railroad problems of interest to the lumbermen at large; credit rating; forest taxation, etc. It has also recently undertaken a campaign for a more widespread use of lumber. To accomplish this end a Forest Products Exposition will be opened during the coming winter in some of the larger centers in which will be displayed the various present uses of wood, and new ones pointed out. The exhibit will also include many other features connected with the lumber industry which will be of interest to the general public.

WHOLESALE ASSOCIATIONS.

While wholesalers are admitted to membership in some of the manufacturers associations, they also maintain organizations of their own which foster the wholesale lumber trade. These associations are of two classes, namely, national and local.

The membership of the more important national association, known as the National Wholesale Lumber Dealers' Association, is composed both of wholesalers and manufacturers. Membership is confined largely to the territory East of the Mississippi River. Among the objects of the organization are the regulation of lumber inspection in the more important markets of the East; the protection of the wholesale interests in the matter of railroad regulations; and other matters of importance to the members which may arise from time to time. Interest has been manifested in forestry matters, but this has not yet taken on any tangible form.

The local associations, often called lumber exchanges, are found in every large lumber market in the eastern part of the United States. The membership is composed of those lumbermen resident in the city in which the exhcange is located. The main functions are the adjustment of problems of local interest to wholesale lumbermen.

RETAIL ASSOCIATIONS.

Retail lumber dealers' associations are found in almost every State in the Union, although some cover two, and in one case four, States. They are an important factor in the retail trade and are active in guarding the interests of their members.

FORTY-EIGHT IN BUFFALO HERD.

The buffalo herd on the Wichita national forest, Oklahoma, now numbers 48, 10 *calves having been born this year. When the buffalo were introduced on the Wichita in* 1907 *there were* 15 *head.*

CONSERVATION MOVEMENT IN CHINA.

A conservation movement has been started in China, said to be richer in natural resources than any other nation. The Chinese use the word "conservancy" instead of conservation. One of their plans for the Hwai River contemplates dredging and tillage together to control floods.

SOME RESULTS OF SCIENTIFIC FORESTRY MANAGEMENT

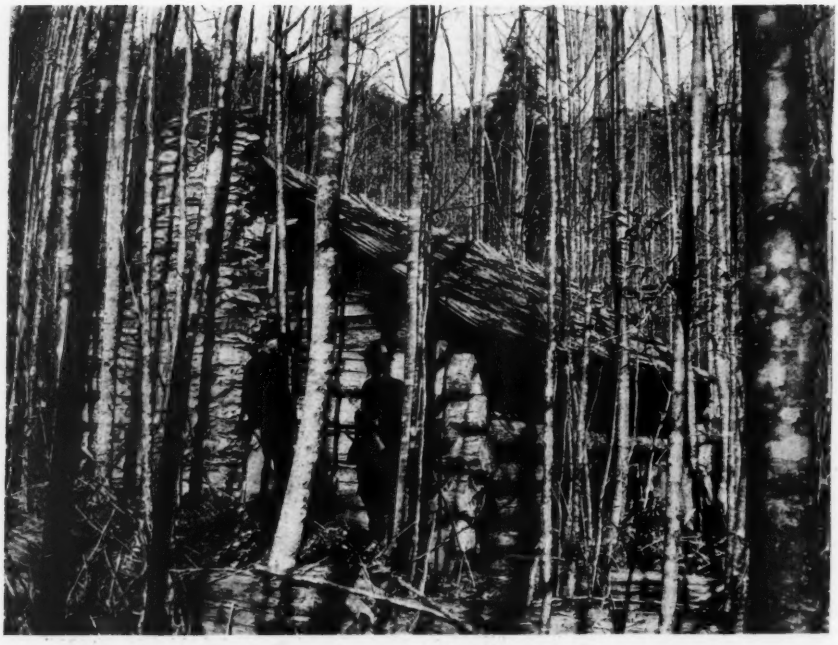
By S. B. Elliott

NOT far from twenty years ago there was begun near Asheville, N. C., on what is generally known as the Biltmore estate of Mr. Geo. K. Vanderbilt, what was practically the first attempt at systematic forestry in this country. Spasmodic efforts had been made in several places in what, for want of a better name, may be called amateur forestry—that is, each individual engaged in it carried out, but without experience or training, his own notions and methods, and the methods were as diverse and the results as different as were the individuals themselves. But at Biltmore was begun scientific work, and that kind of work has since been carried on there under the direction and supervision of educated foresters. Necessarily some of it was experimental, for conditons in this country were unlike those found in Europe. Our soil, climate, locations, and, in the main, species of trees, were all different. But these experiments were based on fundamental principles well known and, in the main, were bound to succeed.

The first work was done under the administration of Mr. Gifford Pinchot, late chief of the United States Forest Service. He was followed by Dr. C. A. Schenck, now at the head of the Biltmore Forest school. Just how much each one did I do not know, but that does not matter, as the work was carried on along the same lines. It has been my pleasure to twice visit and observe the work done there, once about five years ago and the other time in March last, and the observations made at each of these visits gave me a fair opportunity to judge of the progress and the results of the work that these trained foresters have done, and to draw conclusions concerning their success, and the practicability of applying their methods to other sections of our country. Under neither of these eminent foresters has there been any wild schemes of indiscriminate planting of species, but a consistent planting of such native trees as will be of commercial value when mature. White pine, which naturally grows well there, was the principal one, but black walnut, short-leaf pine, sugar maple, with a few exotics such as Norway spruce and Western yellow pine, have been planted to a very limited extent.

Some of the white-pine planting had been done for scenic effect and along the line of landscape gardening, and I will speak of this to contrast the practical results between that and the system of close and regular planting demanded for forestry purposes. This landscape-gardening work, so far as regularity of planting and density or openness of stand goes, is substantially the same as prevails when natural regeneration is looked for after cutting off virgin forests. There are some dense clusters and in some places the trees stand quite far apart, frequently ranging from three or four feet up to sixteen and even twenty or more feet apart. The inevitable result has ensued. Where the stand is dense all the limbs on the lower part of the trees died when small and are dropping off. In forestry parlance the trees are "cleaning themselves," while the limbs on the trees far apart are large and are alive from the ground up. Where one side of a tree is next to others and an open space is on the other side, the limbs are dead or dying next to the close neighbors, while all are alive on the other side. This, of course, comes from a tree's well-known demand for light.

Where the planting has been done for forestry purposes there are to be found few, and in most cases no, live



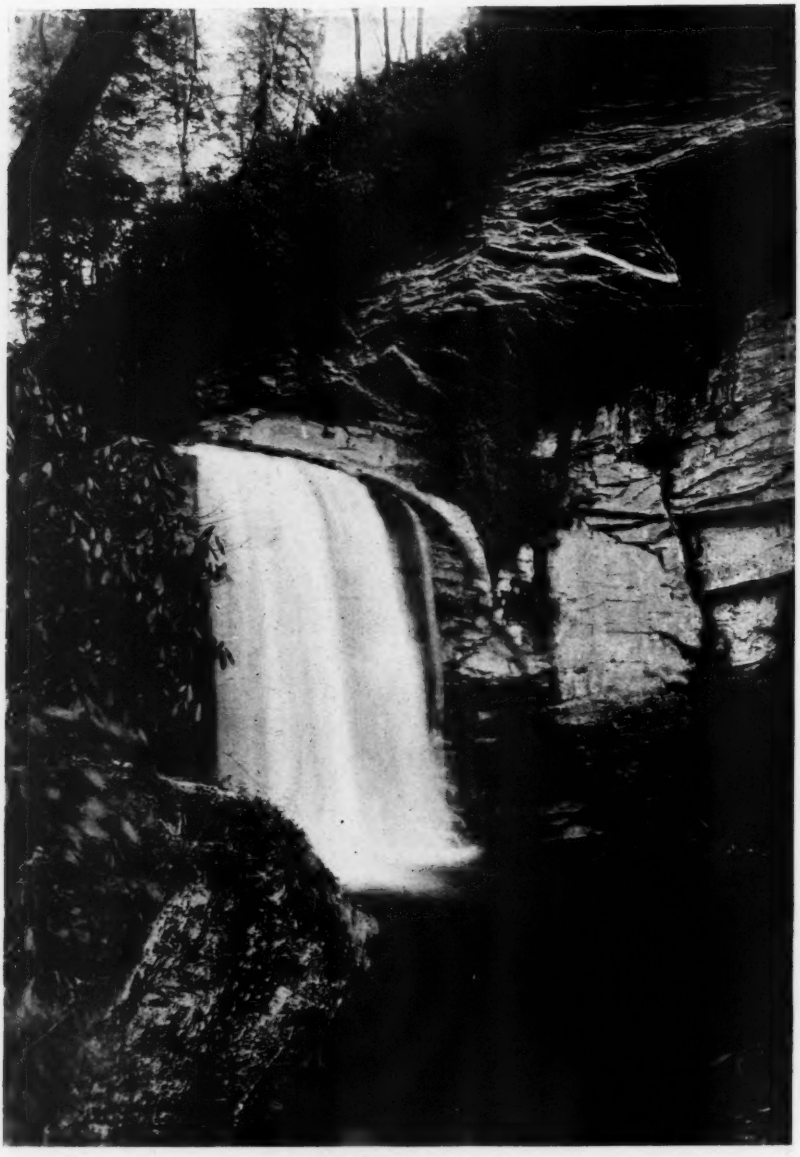
LOGGING CABIN, BIG CREEK, ABOUT THREE MILES BELOW LODGE, GROWN UP WITH POPLAR.

lower limbs and none of either kind is large. Every tree of such planting that will be permitted to mature will make a good timber tree, and after the last thinning is done there will be a full stand—all that the land can be made to grow—of perfect trees, each tree producing the highest grade of lumber and of satisfactory lengths and dimensions. Where not so planted—that is, planted for scenic effect alone—the yield will be much less, and, as the stand will be composed largely of imperfect trees, it will produce not only less valuable lumber than the other but less in quantity; and that is nearly always the case in natural regeneration. But in this scenic planting there has been a control of species; yet in natural regeneration there can be none east of the Rocky Mountains, except in the case of chestnut—a tree probably doomed to ultimate extinction. The lesson which this teaches is that we must resort to planting in order to secure the desired species and obtain a satisfactory yield.

The trees first planted range in diameter from eight to twelve inches at thirty inches above the ground, varying somewhat according to soil or location, but mainly according to density of stand. Where close they are less in diameter but taller, and there is more available lumber in them and always will be than in those grown in the open. The wood is in the stem and not in the limbs, and what is more the lumber will be of better quality.

Some of the forestry planting had been done experimentally as to distance apart, ranging from three by three, four by four, five by five, and even six by six feet apart each way. In one stand the trees were two feet apart in the rows and the rows four feet apart. Evidently this method was adopted with a view of first taking out every other tree in each row, leaving the stand four by four feet for subsequent

MOUNTAINS TO EAST OF DEVIL'S COURT HOUSE.



LOOKING GLASS FALLS.

consideration. This demands a large number of trees per acre, and presupposes the removal of one-half the stand at the first thinning. This may work well if the thinning is made early enough, but unless that is done the result, as here shown, is that in the struggle for supremacy all are seriously affected.

Each system adopted appears to have some advantage not possessed by the others, although this may have been

OAK AND POPLAR IN ST JOHN'S RESERVE NEAR LOOKING GLASS ROCK.

brought about, in part if not wholly, by conditions of soil and situation. The stand planted three by three feet apart is remarkable for its evenness of growth. It is probably about twelve years old from seed. My recollection is that when I first saw it five years ago that I was told it was then seven years old. It was in March last fully twelve feet high, the last year making a growth on the average of not less than thirty inches. The stand is so dense that it is with difficulty that one can pass through it. All the lower limbs

POPLAR REGENERATION NEAR SPLASH DAM ON NORTH FORK OF MILLS RIVER.

are dead, and others are dying for a height of at least four feet from the ground. The lowest ones are falling off. The forest floor is in ideal condition and the crown still shows vigor; yet it is a question whether thinning should not have been begun, but in a careful manner. If not done soon the result may be what has occurred where the stand is two feet apart in the rows with the rows four feet apart, a checking of the growth of all.

The growth of white pine in its early life in this part of North Carolina is

POPLAR REGENERATION ON FIELD ABANDONED ON DAVIDSON RIVER TWENTY YEARS AGO.

phenomenal, and doubtless accounts for the need of thinning at twelve years from seed, even though planted three by three feet apart. I saw several cases where the growth in height for the past year had been four feet.

Considerable trimming had been done where planting had been for scenic effect. This work had been admirably carried on and the wounds were fast healing, and as turpentine naturally covered the wound fungi cannot enter

and the lumber will have only sound knots, but it will have plenty of them.

Taken all in all the whole work is a valuable object lesson and should encourage every forester to emulate it. It is an earnest of success that will come to those who do likewise. And for this pioneer work credit should be freely given to those who saw, and dared, and did.

GOVERNMENT REPORTS LOWEST FIRE LOSS

WITH the middle of September the fire season on the national forests has come practically to an end with less damage than ever recorded. There is always some danger from carelessness of campers or of settlers burning brush and clearing land, but the real danger season extends only from the middle of June until the middle of September.

Forest officers throughout the West are congratulating themselves on a season so markedly free from heavy losses. They feel that the immunity from loss has been due to two principal causes, partly to a favorable season, but largely to a much better organization for fire prevention than has been attained heretofore. The effectiveness of the organization is shown particularly by the fact that while there were in all approximately 2,260 fires, as against 2,470 last year, yet the area burned so far this year is only about 60,000 acres as against 230,000 acres in 1912, and 780,000 in 1911.

A single administrative district, which covers the intermountain region of southern Idaho, western Wyoming, Utah, Nevada, and western Arizona, gives an example of the most favorable situation. Only 43 fires were encountered, 29 of which originated in Idaho. The total area burned over amounted to only 956 acres, which is considerably less than four one-hundred-thousandths of the total area patrolled by forest officers in these States.

California, Arizona, and New Mexico have suffered most during the past season.

The various causes of fires have not changed greatly in their relative proportions. Railroads and lightning head the list, with campers next. There has been, however, a marked decrease in the number of fires caused by burning brush, which, according to the forest officers, indicates a closer cooperation with the settlers in and near the forests and with timberland owners in fire prevention and control. It is still true, nevertheless, that a large proportion of all fires started are due to human agencies and may generally be charged against carelessness. Fires caused by lightning are of course not preventable; but the system of lookouts by which they may be detected immediately after being set is greatly lessening the loss from this source.

ARGUMENT FOR TREATMENT.

In an experimental test track near Janesville, Wis., an inspection just made showed that hemlock and tamarack ties put in the track without preservative treatment were decayed after five and one-half years' service. Those which had been treated were practically as good as when first laid.

LIGHT BURNING IN INDIA HARMFUL.

Light burning of underbrush to remove forest litter had been practiced in India, with the idea that it improves conditions for teak growing. Now, after long investigations, forest officials there say that the fires are harmful, that full fire protection must be extended everywhere, and that to be really effective this protection must be continuous.

"THE TENDERFOOT FROM YALE"

By Will C. Barnes

THE trouble with this here forest service business nowadays is, that they're sendin' out from the effete and luxurious East, a lot of half-baked kids, what never seen a mountain in all their lives, don't know whether beans is picked from trees or made in a factory at Battle Creek, an' generally ain't got savvey enough to find their way home after dark.

"Now here's this kid we've drawed in the last deal; nice enough boys, I reckon, but who's goin' to play nursey to him up in these here hills?" The speaker glared at his companion as if defying him to meet his charges against the new comer and his kind.

"But he's got eddication, Jack," replied his listener, "an' that's what counts in these days. We got into the service in them good old days when it was a case of ability to ride a pitchin' bronk, rope a maverick, chase sheep herders off the earth, shoot the eyes out of a wild cat at forty yards an' all them things.

"Nowadays, they picks 'em out by their brand of learnin' an' not by their high-heeled boots."

"Howsomever," he continued, "there's some of them that makes good in spite of their eddicational handicap. Over on the Sierra last fall we was all a settin' in camp one Sunday afternoon, when the phone rings like they was trying to wake the dead with it.

"The old man gits up to answer it. When he says, sort of startled like, 'Fire, where?' we all pricks up our ears. 'Twas a mighty dry time an' every one was a prayin' for rain for we'd been fightin' fire for the last month and was all in.

"We had a fire lookout station up on top of a high peak an' a man with the best glasses money could buy a-sittin' there who could see all over the range for fifty miles.

"Say, people got so they was afraid to make a camp fire anywheres in them hills, an' the Rangers swore they had to go behind a tree to light their pipes, lest he'd see the smoke an' send in a fire call.

" 'Shut-eye,' said the old man, meaning the lookout; 'Shut-eye says there's a big smoke a-comin' out of the cañon below Gold Gulch to the left of Greyback Peak, an' I reckon we'd better be a-moving that way.'

"It didn't take us long to saddle up, slap a pack onto a couple of mules an' hit the trail. 'Twas a good ten-mile over a rough country, an' it was mighty nigh dark afore we gets to where we could see the smoke a-boiling out of the cañon over a ridge ahead of us.

"We was all old-timers at the work, ceptin' a young feller fresh from the Yale Forestry School, what had come out for a sort of post-graduate course in forestry an' some of them boys was seein' to it he got it all right.

"He had all the fixin's them fellers bring along with them, fancy ridin' panties, a muley saddle, a wind bed an' a automatic six pistol, one of them things what after she once gits to shootin' you jist got to throw her into the creek to stop it goin'.

"Bout two mile from the ridge where we reckoned we'd git our first view of the fire we meets up with Hank Strong an' his wife. You know Hank's woman is just about as crazy to go to a fire as a boy to the circus, an' she always comes in mighty handy to start a camp, take care of the boys' horses an' the packs while we're a fightin'.

"Generally, she'd make up a big pot of coffee and fetch it out to the line. Once she comes ridin' along carryin' a pot full an' a bear skeered her hoss—but that's nothin' to do with this yarn.

"Hank says that there's a big smoke comin' up from the vicinity of Granite Basin an' the old man he says some one better go over there an' see what's goin' on. They's a chap named Brown a-living in the Basin, an' the Super, he's afraid mebbe so he'd get caught

in the fire an' be singed some, the Basin bein' in the allfiredest lot of chapparal brush you ever see.

"This feller Brown, he's a sort of pet of them boys over that-a-way, him bein' a lunger an' not able to do much but draw funny pictures for the Sunday supplements. Seems he broke down back East an' comes West to try an' git over it.

"There he sets a-drawin' pictures for them funny papers an' sendin' 'em in regular while he ses he's 'jist a walkin' around to beat the undertaker.'

"Nobody else is a-livin' in the Basin, there bein' nothin' but a little old cabin what a bee man put up once an' a few hives of bees Brown bought along with the cabin. 'Them bees is jist to teach me habits of indystry,' ses Brown when some of the boys asked him if he calculated to git rich on the output of them hives.

"The old man he reckons he can't spare any of us old hands to go over there an' so he says to the young tenderfoot, 'Son,' he says, 'do you reckon you can make it over there in the dark and find out what's doin' in Granite Basin an' come back an' let us know?'

"The boy, he ses he reckoned he could, only he didn't know the trail all the way. Then Hank's wife she speaks up, an' says she can go along as far as the top of the mountain, an' show him the trail down into the basin.

"It sort of hacked the kid to have a woman show him the trail, but the old man said it were the very idee, an' so she an' the boy struck off in the dark, leavin' us to take care of the fire ahead.

"There wasn't but one way into the basin an' that was down a graded trail about two miles long from top to bottom that the bee man had made to git out an' in on.

"The lower part of this basin was one great mass of brush, an' as thick as the hair on a dog's back, so you couldn't git through it only where the brush had been cut out.

"When they gits to the top an' could see over the basin, there wa'nt any doubt but there was a fire all right an' it was mighty plain that if Brown wasn't already out of there it was time he was starting.

"Hank's wife were a-dyin' to go down with him, but the kid he ses, 'this here's my job please' an' bluffed her out.

" 'You look out you don't get cut off on the trail,' she warns him, 'the way that fire's a-eatin' along the side of the basin, it's a-goin' to reach the trail inside of an hour, an' there ain't no other way out ceptin' a foot path what goes up the side of the basin back of the cabin, but it's more like a ladder than a trail an' you can't take your hoss there a-tall.'

"Down into the basin goes the boy, while instead of goin' back to the outfit the woman stopped there on a little point of rock where she could look all over the basin an' waited to see what'd happen.

"Brown slep' out under a big ole oak tree an' as he gits near the cabin the kid he lets out a yell or two to wake him an' finds Brown settin' up in bed sort of half-dazed, what with the yellin' an' the onnatural brightness of the skies all abouts.

"Inside of five minutes they was a ridin' for the trail up the mountain with Brown a-settin' behind on the kid's horse.

"But it were too late. When they reached the foot of the trail they could see where 'bout half way up the whole blamed mountain was afire. Nothin' could pass through it an' live, so there wa'nt nothin' to do but go back an' try to get out on the foot trail.

"Brown he begs the kid to go on an' leave him an' save hisself, 'I'm only a worn-out shell, anyhow,' he ses, 'an' it's jist a question of time till it's all over for me an' I cash in, but you got something to live for ahead of you.'

"But the kid wouldn't stand for it.

" 'Don't you talk to me 'bout leavin' you here like a rat in a trap,' ses he, 'we'll make it up that trail all right; jist you hang onto me and we'll make the hoss pack us as far as he can go, an' then we'll take it afoot. If it comes to a showdown I can carry you easy enough.'

"So they rides the hoss up the trail

till where it runs into a cliff 'bout twenty feet high. Here they was a ladder to git up the cliff an' the kid he strips oft the saddle an' turns his hoss loose to shift fer hisself.

"Time they gits up that ladder pore Brown he were all in an' had to lie down on the ground a-coughin' fit to kill hisself.

"This trail was jist a foot trail cut through the chapparal an' the smoke an' heat was already a rollin' down onto 'em where they was like a blast from a furnace. The kid he wets their handkerchiefs from his water bottle an' they each tied 'em about their faces to sort of protect 'em a little.

"The boy, he looks mighty anxious like, at them big, high walls of flames a-comin' down towards 'em, an' fairly forced Brown to git on his back 'pick-a-back' like you'd take a little kid, an' started slowly up the trail.

"Foot by foot he climbed to'ds the top. Sometimes the smoke got so thick they had to lie down a minute clost to the ground to git their breath, sometimes the wind dropped big, blazin' brands onto 'em an' set their clothes afire, an' he'd have to stop an' rub it out with his hands.

"Every time he took a look up to'ds the top, he'd see the fire a-comin' closter an' closter to the trail. Pore Brown he tried to help him some by walkin' but between the excitement an' the smoke gittin' into his lungs, it were too much for him an' he dropped down helpless as a new-born baby.

"The kid, he takes a survey of things an' little as he knowed 'bout fires in the chaparral, he seen mighty plain, that they were at the critical pint, an' if they didn't git past the next hundred feet mighty soon, the fire would cut 'em off an' it would be good bye gay world to 'em both.

"Then he hears a moan from Brown an' lookin' round sees him lyin' flat on the ground with one hand clapped over his mouth an' tricklin' between his fingers was a stream of blood. Didn't take him but a second to know it were a hemorrhage (beats all what them fellers do learn at them colleges).

"Brown were a-workin' away with one hand at the little pocket in his shirt an' in his eagerness an' excitement, the button wouldn't come open. The boy jumped to his side, tore the button lose an' pulled from the pocket a little tobacco sack with something in it. Brown he holds out one hand palm up, an' nodded to the boy to open the sack, which he did an' then poured out into his hand a little pile of common table salt. You know them lunger fellers most of 'em carries a little sack of salt agin jist such emergencies. Brown he throwed his head back, an' swallowed every grain of it an' bime-by the blood stopped running so hard. Then he waves his hand to'ds the top an', with a beseechin' look in his eyes, tried to git the kid to savvey that he was to go on an' leave him to die.

"But the boy, he wa'nt made of that sort of stuff, he's jist about skeered to death at the sight of the blood but he pulls hisself together, grabs Brown in his arms agin, an' grits his teeth for another fight for their lives.

"Finally he comes to a place where about ten feet ahead the fire was clean acrost the trail. He puts Brown down for a minute, pulls off his coat, lays it on the ground an' pours over it what water was left in his water bottle. Then he wraps Brown's head an' shoulders in the coat an' grabbing him up in his arms agin makes a last dash through the smoke an' fire.

"Seems like he hears a woman's voice above the roar of the fire an' he sort of wonders is he a-gittin' a little loco with it all. Next he knows he's a drawin' in big gulps of air that ain't full of smoke an' there's a woman a-walkin' long side of him, steadyin' him as he staggers under his load an' a rubbin' out, with a wet gunny sack, the places where his an' Brown's clothes are a-smokin'.

"It all appears like a horrible dream to him an' fust thing he knows he don't know nothin' for he's gone an' keeled over in a dead faint. Don't laugh, you fool, didn't you ever work at a fire till it seemed as if your lungs was a-goin' to bust an' your heart was a beatin' like a cock patridge on a log?

"Then he gits a quart or more of

cold water slap in the face, opens his eyes an' there's Hank's wife a-standin' over him.

"Clost by was Brown, alive an' apparently uninjured. When we comes along 'bout three hours later, we finds the boy and the woman hard at work, back firin' along the old stage road an' the fire pretty well under control on that side.

"Say, that kid were a sight to look at. He ain't got no more eyebrows or lashes than a rabbit, an' that there curly mop of his was singed an' scorched, like the rats had been a chawin' onto it.

" 'And Brown?' asked Jack.

" 'Oh, Brown, why he come through all right. Saw a lot of his funny pictures in the Sunday supplement las' week. 'Peared like the fire done him good.' "

SPARK ARRESTERS ON RAILROAD LOCOMOTIVES

By Ralph C. Hawley

IN the United States at the present time between twenty-five and fifty per cent of the forest fires are started by sparks from railroad locomotives. Large amounts, often exceeding $50,000 on single lines, are paid annually by the railroads in settlement of damage claims.

It has long been recognized that railway locomotives increase the fire hazard both to forest property and to buildings, and efforts have been made to prevent the escape of sparks by the use of screens. An investigation made in 1911 showed that out of forty-one States reporting, sixteen required by law that screens for arresting sparks be placed on railway locomotives. Seventeen States do not require this by law and eight States reported that while not required by law, yet the railroads equipped all locomotives with such devices. As a matter of fact this is the case over practically the entire country.

These screens are so placed in the smokestacks or in the front end of the locomotives as to arrest any sparks that might be carried out the stack. This sounds very simple and at first thought it would seem as though fires set by sparks from railroad locomotives ought to be uncommon since practically all locomotives have screens. The truth of the matter is that these screens as often required by law and customarily used on railroads, no not efficiently perform this function of arresting fire-bearing sparks. In order to explain why this is so it will be necessary to briefly describe the interior arrangement and working of the ordinary railway locomotive.

Locomotives cast more sparks than other types of power plant developing the same amount of power. A locomotive is constructed with the primary idea of developing enormous power in small compass without regard for such things as spark loss, smoke emission, etc. The modern engines often burn 5,000 pounds of coal per hour when being operated. Only in forges or furnaces employed for metallurgical purposes are fires burned with greater intensity than in locomotives. This is accompanied by creating a forced draft of high velocity. Unless such a draft is maintained the power of the engine is crippled. This draft passes up from beneath the grate through the firebox and boiler tubes into the smokebox, a large open space in the front end of the locomotive just ahead of the boiler and under the smokestack, and finally out the smokestack. So powerful is this draft that pieces of fuel are carried along and may be cast out of the stack in the form of sparks. From 5 to 20 per cent of the fuel may be carried by the draft into the front end of the locomotive. The number and size of the pieces of fuel picked up and blown out as sparks depends on the force of the draft and the character of the fuel. Wood and soft coal will give more sparks than anthracite coal.

To prevent the pieces of fuel or cinders from being thrown from the

stack, screens of woven wire or perforated iron plates are placed in the smokebox of the engine. Through this screen the draft rushes; the large cinders strike against it, rebound, and continue this process until finally beaten into small enough pieces to go through the screen.

These screens to be satisfactory must meet two conditions:

1st. Have small enough openings so that no live spark can pass through.

2nd. Be sufficiently large so that the screen will not clog up and the draft be interfered with.

The best compromise between these two rather conflicting conditions calls for openings in the screen of not over one-fourth inch across with about two and one-half to three meshes of wire to the inch.

Such a screen if in perfect condition should prevent the passage of practically all live sparks. Its disadvantages are that it is difficult to keep in perfect condition because it burns out readily and may warp and make openings around the edges. With certain types of fuel, such as some lignite coals, the screen may clog so badly as to seriously curtail the draft and hence the steaming power of the locomotive. That these screens are not fully efficient in stopping the casting of sparks is abundantly proved over and over again during every forest fire season.

During the last few years the increasing interest in forestry and greater attention given to suppressing forest fires has resulted in more thought being put on the development of a really satisfactory spark arrester; one which would actually stop all sparks and at the same time not interfere with the draft. Private individuals and the railroads themselves have been working on the problem to such success that there are on the market today several spark arresters much more efficient than the old style screens. No arrester for railway locomotives is as yet on the market which can be said to fully cover the needs of the case.

A few of the better spark arresters are briefly described and names of the concerns manufacturing them can be secured on application.

The Mudge-Slater Spark Arrester or "Locomotive Box Front End," is a modification of the standard screen arrangement. The smoke stack is extended down into the smoke box of the engine and to the lower end of the stack is attached a box with top, bottom and back of sheet steel and sides of woven wire netting. The advantages over the old arrangement are that the parts are much more carefully joined together and will not warp; the arrester is very easy to work around and keep in condition. It can be taken right out of the engine and brought into court in damage suits, and better steaming of the engines fitted with these arresters is claimed. Over one thousand of these arresters are in use in the engines of the Chicago and Northwestern Railroad. State Forester Griffith of Wisconsin recommends the arresters as giving very good service.

The Radley-Hunter Stack, is also in actual use especially on logging railways. A special smokestack must be used containing the arrester. This stack is equipped with an iron cone against which sparks strike in coming up the stack. They are deflected with a spiral motion toward the sides of the stack where they pass through a perforated screen. They are then beyond the strongest draft and fall into a receiving chamber from which they can be drawn off. Sparks may rebound from the screen or lighter ones never strike it and be carried higher up the stack where they are intercepted by another screen projecting straight down from the top edge of the stack. There is at all times an absolutely free passage for the draft and clogging of the screen is avoided. This arrester is especially good for soft fuel where danger of clogging is found. For stopping sparks the arrester depends on throwing the sparks out of the strongest current of the draft and either retaining them in the receiving pit or breaking them up by impact against plate and screen.

The Van Horn-Endsley Spark Ar-

rester, by means of a spiral plate placed in the smoke box just ahead of the boiler tubes imparts a rotary motion to the gases and cinders carried by the draft through the flues. The spiral plate finally is stopped by a vertical partition right across the smoke box, the only outlet being a hole in the middle of the partition. Through this hole the gases escape and pass up the smoke stack, but the cinders being heavier, have been carried by the rotary motion (centrifugal force) around the outside of the locomotive shell and finally are stopped by the partition. They then fall by gravity into a hopper which can be emptied as required. The arrester separates the cinders from the gases by means of a rotary motion and provides two outlets, one for gases and the other for cinders. There are no screens to impede the draft. As yet this arrester is not used extensively having been but recently perfected and patented. In trials it has worked very successfully and may prove to be the best arrester of sparks yet devised.

The Westralian Rotary Spark Arrester, consists of a rectangular box placed on top of the smoke stack. This box contains two wheels (resembling paddle wheels) with eight long arms covered with wire netting. These wheels are so arranged that as they revolve the arms interlock. When the locomotive is moving the wheels revolve downward against the uprushing draft. The netting allows all gases to pass through but catches the sparks and drops them into chutes on each side of the smoke stack.

The arrester is not in actual use on any railroads in the United States but has been used in Australian and other foreign countries. It is now being tried out at Purdue University.

Many other arresters have been patented and are in use but the few above described illustrate the different types so far invented.

If fires set by locomotives are to be stopped, spark arresters must also be placed on ash pans and grate openings. The escape of sparks from grates and ash pans can be prevented by use of wire nettings.

In conclusion it must be acknowledged that as yet no spark arrester is in use which will absolutely prevent the escape of all live sparks. Change of fuel from coal and wood to oil or electricity, would solve the problem of railroad fires. The extent to which these fuels will be substituted for coal and wood in the next few years cannot be foretold, but undoubtedly there is a tendency toward this change in many parts of the country, the railroads being led to it mainly from reasons aside from the fire question.

EFFECTIVE FOREST FIRE POSTER.

The Department of Forestry of Pennsylvania has just issued a forest fire poster, 14½22 inches in size, to be distributed generally over the forested regions of the State. It contrasts vividly the advantages of protected forests and the curses which befall us as the result of forest fires.

Forest fires, in most cases, result from the carelessness or indifference of some one. A burning match, a cigar or cigarette stub, or pipe ashes may be heedlessly dropped along the edge of a road or path through the forest; a small fire at camp or on a game runway is built and not thoroughly extinguished; these little things may be the cause of untold loss in many ways to innocent people.

STUDYING FOREST INSECTS.

An organization of scientists who are engaged in the study of forest insects has recently been formed in Washington.

FIRE RANGERS USE STEEL TOWERS.

The steel towers that support electric power transmission lines are being increasingly used by forest rangers as fire lookout stations on national forests. With the harnessing of the mountain streams a network of these lines is gradually being woven over the forests and in the absence of other convenient lookouts, the rangers find the steel towers helpful in their fire patrol work.

A 100 YEARS PEACE PARK

By T. Kennard Thomson

[Mr. Thomson is one of the foremost civil engineers in the United States, and a valuable contributor to engineering literature. He here describes an idea which should arouse considerable comment.—The Editor.]

IN 1914-15 there will be a great celebration in all English-speaking countries, and it is hoped the whole world will join in, to commemorate the 100th anniversary of the signing of the Treaty of Ghent.

The celebration will take many forms: Educating the school children, permanent monuments, international bridges over the Niagara River, etc.

I have a plan which would, I think, do untold good to a large portion of this country and Canada, and I hope to see the proposition taken up and pushed to a successful conclusion.

My plan is simply this: Have the Governments of the United States and Canada each buy a strip of land ten miles wide, making a total width of twenty miles, from Lake Superior to the Pacific Ocean, about 1,500 miles in length, and make it an international park and forest and home for wild animals, birds and fish.

The advantages of such a "Wind Break," such as this park would form, must be apparent to all; it would surely benefit the climate, and thus greatly enhance the value of the land from the Gulf of Mexico to Saskatoon and Edmonton.

By proper management it could be made not only self-supporting, but also a profit producer, through sale of timber, furs, animals, fish, etc.

Anyone from the East, on going to St. Louis for the first time, or, in fact, anywhere from the Gulf of Mexico up the Mississippi Valley and then on North over the 49th parallel into Canada through Manitoba, Saskatchewan or Alberta, must have marveled at the sudden extremes of temperature. To take a single example: A friend of mine left the very prosperous city of Saskatoon some two years ago in a light snow storm, on the third day of June, and in the same city, early in July of the same year, it was 107 in the shade. This may be accounted for by the fact that the icy winds of the North and the hot blasts from the South have a free sweep with practically no obstruction.

For some years I have been trying to evolve some practical scheme for overcoming this serious handicap; and it seems to me that an international park forest would greatly benefit the climate of all of Canada and the United States.

In addition to the great financial benefits, due to climate, which would accrue to both countries through the construction of such an international forest, a very large revenue could be obtained through judicious cutting of trees, after a comparatively few years, when the cutting and planting of suitable trees would be practically a continuous operation.

This international park should start from the shores of Lake Superior, the surface of which is 600 feet above the sea level, and where the land abruptly rises to 1,000 and 1,500 feet elevation for about 350 miles, most of which is through the wild and beautiful Lake of the Woods district, with a very large percentage of river and lakes through Minnesota and Manitoba.

Then the level drops slightly for fifty or sixty miles, while crossing the Red River Valley, which divides Minnesota from North Dakota.

In the next two hundred miles going west, the land rises from elevation 1,000 to elevation 2,000, where the park would still be on the prairies of the Province of Manitoba and the State of North Dakota.

Then in a stretch of some 550 miles, passing through North Dakota and

Montana on the south of parallel 49 and the Provinces of Saskatchewan and Alberta on the north, the ground gradually rises from elevation 2,000 to 4,000; then the main range of the Rocky Mountains suddenly towers up into the skies, with magnificent snow-capped peaks which can be seen for many miles, until the distance makes the snow appear to be of beautiful blue shades—an inspiring sight worthy of a long journey.

Our park would then cross the backbone of the Rockies, down and across the Kootenay Valley, over the second range of mountains, again across the Kootenay Valley, over the hills again, down across the great Columbia River, and so on over mountains and streams galore. About 400 miles would be taken from British Columbia, the States to the south, of course, being Montana and Washington, passing over the Selkirks, Gold and Coast Ranges of mountains to the Straits of San Juan de Fuca—a majestic park, indeed.

The variations in elevation, as we have seen, vary from 600 feet on Lake Superior, up gradually over the flat prairies, over the Rockies, some of whose peaks rise over 13,000 feet, and abruptly down to the sea level on the Pacific Coast, covering an equally wide range of climate, soil, etc.

To give a list of the different kinds of animals, birds and fish, that could be bred to advantage on this 30,000 square miles of park, forest, lake and stream, would take more space than is allotted me in this article.

But the park could be divided in vast areas, suitable for the different kinds of animals, so that tourists could safely see the wildest grizzly and other animals, a few feet away through iron fences, from the top of viaducts or other safe positions.

By making these boulevards free to the world, enormous crowds would be continually going to see the greatest park in the world, affording much revenue to the railroads and hotels, all over America as well as the steamship lines. And the sale of furs and animals, fish and feathers to the sightseers, would pay the governments a big interest on the investment, apart entirely from the incalculable benefits to the entire country, East or West of the Rockies.

LIGHT BURNING ON PINE FORESTS

THE effect of light surface fires on pine timber is to kill or damage more than half of the mature trees, according to findings just announced by the U. S. Forest Service. The studies were made on the Wallowa and Whitman national forests in the Blue Mountains of eastern Oregon. Several typical stands of western yellow pine were selected, where surface fires had recently burned. The region had been periodically run over by such fires for a long time. The most recently burned areas were carefully surveyed and all the trees individually studied to find the effect of the fire.

As a result of this survey the following facts were verified: A surface fire fells from one to three merchantable trees per acre, by eating out basal fire scars; it makes fire scars at the base of 42 per cent, or nearly one half, of all the merchantable yellow pine; it actually burns to death more than 3 per cent of the trees—that is, they are killed by the heat of the light surface fire at their bases. In short, of the mature trees more than one-half of the total stand suffer more or less damage.

The stands were selected to insure results representative of the region, according to the forest service investigators, who draw the conclusion that deliberate light burning in such localities to remove brush and undergrowth is distinctly uneconomical, particularly since successive surface burnings only heighten the injury to the trees and make it cumulative.

FORESTRY STUDENTS PLANTING TREES. AN ACRE OF LAND IS PLANTED WITH 1,200 TREES AT A COST, INCLUDING TREES, OF $6 TO $9.

PENNSYLVANIA STATE FOREST ACADEMY

By Geo. H. Wirt

IN 1897 the State of Pennsylvania pledged itself to the policy of purchasing mountain land for the establishment of State forest reserves. Land was being acquired as early as 1900, and from that time on the area purchased rapidly increased. With those who had this work in charge there was constantly before them the problem as to where they might obtain the kind of men they desired to care for these State lands and to develop them for the greatest good to the State. Primarily it was the intention to employ as far as possible only Pennsylvania citizens.

After repeated efforts had been made to establish a school of forestry in then existing State institutions of learning, and such efforts having been unsuccessful, it was decided to organize a school of forestry directly under the supervision of the State Department of Forestry. By doing this it was thought that to a very large degree the forest service of the State would be kept free from politics in its appointments as it had been in its development. Only Pennsylvania citizens were to be appointed to this institution, after having passed a satisfactory physical and mental examination. By receiving their instruction and necessary supplies free of charge they would feel that they were under obligation to the State for loyal service. At the Department's own institution they could be brought to understand and to work for the ideals for which Pennsylvania forestry stands. With the institution placed upon one of the State forest reserves the students could be trained to Pennsylvania conditions and for Pennsylvania service. All these ideas have

A CROP WORTH GROWING. FORESTRY GROWN WHITE PINE—13 YEARS AND 58 YEARS OLD. 500 TO 800 BOARD FEET PER ACRE PER YEAR.

FOREST UTILIZATION. FORESTRY STUDENTS LUMBERING. NOTE ECONOMY IN SAW AND LOW STUMPS.

FOREST MENSURATION. STUDENTS ESTIMATING TIMBER RIPE FOR CUTTING.

A YOUNG HARDWOOD SPROUT FOREST THINNED BY FOREST STUDENTS. ABOUT 7 CORDS PER ACRE OF DEFECTIVE AND SUPPRESSED MATERIAL REMOVED.

been carried out, and time has proved them to be satisfactory.

This institution was established to meet a particular need in Pennsylvania. There was no idea of competing in any way with other forestry schools or of interfering with the prospects of the graduates of other institutions. The State school, however, by reason of the work ahead of it and the opportunities there available because of its position, was to be and is a school where forestry in theory is reinforced by a strong and predominant course in forestry in practice.

The students are admitted after passing a rigid physical examination, a mental examination covering the common school branches of education, and a probationary period of two and a half months with a State forester. The best ten men surviving the three successive examinations are appointed to positions as students at the Academy. Then each appointee signs a contract to complete the three years' course and to perform faithfully such duties as may be assigned to him and to labor for the State as a forester upon salary for three years after graduation. A bond of $500 secures this contract. Every man is admitted upon his own merits, and once admitted must keep his work above a grade of 75 per cent or he may be dismissed at any time.

The course of study at the State Forest Academy covers three years of eleven months each. It was made up after careful consideration of the object of the school and has been changed from time to time as it has been found advisable. Its present arrangement gives a young man thorough preparation in subjects allied to forestry and covers the field of forestry in theory and practice in a very satisfactory manner. It is so arranged that the students may learn the principles upon which forestry work is based and then put them into practice on a 50,000-acre forest and watch the results. The forest is studied at first hand all the time. The library and class-room equipment are fairly complete.

FORESTRY STUDENTS ON A DENDROLOGY FIELD TRIP. IDENTIFYING TREES BY BUDS WHEN LEAVES ARE OFF.

On August 12, 13, and 14 the Alumni of the Academy celebrated the tenth anniversary of the institution. About forty out of the fifty-three graduates returned to inspect the work of former years. Addresses were delivered by Dr. J. T. Rothrock upon "The Early Development of Forestry in Pennsylvania"; by Prof. Filibert Roth upon "The Development of Forestry in the United States in the Last Ten Years"; by E. A. Ziegler, Director, welcoming the Alumni to the Academy, and by George H. Wirt upon "The Early Days of the Academy." Trips of inspection were made every morning and afternoon to view results in plantations and improvement cuttings, and to study the natural regeneration which has developed upon certain areas. As might be expected, a great many interesting facts were brought out on these trips. On the 14th of August the graduating exercises for the year were held, thirteen students being awarded their certificates. Prof. Filibert Roth delivered the principal address. Other addresses were given by Hon. N. B. Critchfield, State Secretary of Agriculture, and Dr. Henry S. Drinker, President of Lehigh University, and president of The American Forestry Association.

LOOKOUT TOWER OF LOGS.

A 115-foot lookout tower on the Sitgreaves National Forest, Arizona, just constructed by forest officers, was built entirely of logs and without the use of hoisting machinery other than ropes and tackle blocks.

UP-TO-DATE ROAD WORK.

Forest officers on the Payette National Forest are using a compressed-air drill in road work on the forest. There is considerable rock work to do, and the drill saves time and money in cutting grades on mountain roads.

FIRE PROTECTION IN THE BLACK HILLS

IF the Black Hills is visited this year by a dry period productive of forest fires, the local forest service will be better prepared than ever before for contending against such conflagrations. In addition to the fire-fighting implements which have heretofore been distributed to various points throughout the national forest, Forest Supervisor Paul D. Kelleter recently has had constructed fifty large boxes, covered with galvanized iron, which are so made that they can be attached to trees and securely fastened there. Each box will contain fire-fighting implements sufficient to equip thirty men. The boxes will be sealed, but can be opened, whenever necessity requires. There is a penalty provided for persons who break the seals and abstract the tools for other purposes than fire fighting. At the present time there are located at different points throughout the northern Black Hills forest, fifty boxes containing fire-fighting tools for fifty men, but these are not placed in the heart of the timber, but at the dwelling of some settler, nearby. These latter equipments must be hauled by team to the scene of a fire, whereas the smaller boxes lately constructed, will be on hand for emergencies without moving them from their various locations. Three of the larger boxes are kept at the government building in Deadwood.

The galvanized iron coverings for the smaller tree boxes are expected to protect them from destruction by a light fire. It is also the intention to cache at various points throughout the forest, supplies of grub, that will be available in cases of emergency, when it is necessary to hurriedly take out a gang of fire fighters, without time to prepare for their mess before starting. When there is time to make full preparations, the forest service has on hand a dozen camping outfits, each capable of supplying cooking utensils for fifty men, which are conveniently packed in wooden boxes that can be readily transported by team from place to place.

In line with the methods being pursued to make forest fire fighting more effective, the local service has had a gang of men engaged in clearing the old wood and logging roads in the Spearfish canyon country. This locality has been one of the most difficult in the Black Hills to move about in, on account of fallen timber and underbrush, and consequently when fires started there, it has been hard to check them. The clearing of the roads will greatly facilitate fire fighting in that section. The government telephone service has been of the greatest benefit in effecting rapid information regarding the location of incipient fires and hence had much to do with getting the forces to work at the earliest possible moment. In one week recently, the look-out on the summit of Custer Peak has discovered no less than a half dozen fires, some of them as much as twenty miles distant, and telephoned information which led to their rapid extinction. The telephone system through the forest is being extended as rapidly as the local office can secure the funds for doing the work and within the past few days has received forty miles of wire, most of which will be used in extending the telephone line west from Nahant.

Weather conditions thus far this year have been adverse to the breaking out of forest fires and consequently there have been no conflagrations of this kind that have done material damage.

WATER POWER FOR LUMBERING.

Acting Secretary of Agriculture Galloway has just granted a final water-power permit to E. P. Ash and Sam Samson, of Stevenson, Washington, the power to be used in logging operations in the vicinity of Wind River. This final permit succeeds a preliminary one granted to the same parties on March 1, 1912.

DU BOIS' SYSTEM OF FIRE PROTECTION

COERT du BOIS, District Forester of the State of California, has worked out a wonderful system of forest fire protection in his territory. He describes one part of his organization as follows:

"On one of the heavily timbered forests in Northern California the district rangers have perfected volunteer forest fire organizations from among the residents of their districts—each volunteer company being assigned a definite area within which it is responsible. For each company there is one chief who receives 40 cents an hour fighting time, one quartermaster and one packer, each paid 35 cents an hour and from 15 to 30 firemen who are paid 30 cents. Any additional men, not members of the volunteer crews, who are employed on a fire, are paid 25 cents an hour. At the beginning of the fire season each member receives a circular letter from the district ranger telling him the names, addresses and officers of his company and the boundary of its fire division, the number of pack horses and saddle horses available at each ranch, the duties of each member on report of a fire, the rates of pay for labor, horses and teams, the location of tool and grub caches, a brief résumé of the district fire plan and a statement of the objects of the organization and the bearing of fire protection on local interests. As the men selected are all small local ranchers and are all connected on farmer phone lines, these organizations have worked almost automatically. Although 20 or more fires have occurred in the area covered by these volunteer companies, we have never had an opportunity to see how they work in a bad fire because they have never let one get bad.

In sparsely settled localities, highly-organized volunteer help is out of the question, of course. We are meeting such conditions with what we call the stationary patrol. During the peak of the fire season as large a number of short-term forest guards are employed as can be squeezed out of the forest allotment. These are stationed at centers of accessibility throughout the ranger district and in every case at a phone. They are given strict orders not to get out of ear-shot of the phone bell and never to leave their stations except under orders from the district ranger. Each station is fully equipped with tools and kept provisioned for two weeks ahead. The entire district is commanded by lookouts who are in communication with the district ranger.

A lookout locates a fire. He reports it to the district ranger, giving its size, exact whereabouts and the speed with which it is spreading. The district ranger telephones one or generally two of the nearest guards, who start immediately with two days' grub on their saddles. The ranger then organizes a crew and a commissary to follow the guards and hold them until the lookout, who is watching the progress of the fire, advises him to forward the reserves. In a remarkably large number of instances the first detachment controlled the fire. In one instance where it did not, the excellent team work on the part of lookout, ranger, guards and a hastily drafted volunteer crew put 25 men on a fire line far back in an inaccessible gulch six hours and a half after the first smoke raised, or at midnight. The fire was under control by daylight and when the men had eaten breakfast they finished the last of the supplies that went out with the crew. The pack train, with a reserve of grub, sent out by the ranger immediately after the men had started, arrived before dinner."

HYDRO-ELECTRIC POWER FOR OROVILLE.

A water-power permit has been granted recently by the Secretary of Agriculture to the Oro Electric Corporation of California. By this permit the company is allowed to use certain lands of the Plumas national forest, near Oroville, Cal., in the development of hydro-electric power.

DECREASING THE FIRE HAZARD

SPEAKING of the value of oil-burning locomotives for decreasing the fire hazard in forested sections, the general master mechanic of the C., M. & St. P. Ry. Co. says:

"The controlling reason for the Puget Sound Lines of our company using oil instead of coal for fuel in its locomotives in Western Montana, Idaho, and Washington, is that it avoids to the fullest extent possible the setting of field and forest fires. This company's lines, in the States named, operate through and in close proximity to Government Forest Reserves and also numerous tracts of private timber holdings.

"If coal-burning engines were used, it would be very nearly impossible or impracticable to safeguard the operation of such engines sufficiently to prevent sparks being thrown from stack, and it is this feature that enters so largely in the common belief that steam locomotives are responsible for having set many field and forest fires. With the best known equipment applied to coal-burning locomotives, it is an impossibility to prevent sparks being thrown from the stack and live cinders being dropped from the ashpan. To remove all combustible matter from the right-of-way and patrol the line thoroughly with proper appliances for fighting fires, the risk in use of coal-burning engines might be reduced materially; but even then it would be a question whether or not the patrolmen would be at the proper place and time to stop the fire. The use of fuel oil has resulted in practically an avoidance of fires set by steam locomotives burning such fuel.

"This company has on its line west of Deer Lodge, Montana (the oil-burning zone), 170 engines in service. Of this number only ten locomotives burn coal, and these are small capacity engines of light construction, which could not be converted into oil burners on account of being too old and not fitted for conversion. They are used on small work train jobs and in other places where there is no liability of fires being set by coal-burning locomotives. But for the fact that the company dispose of this small power to good advantage on other lines of the road, all engines west of Deer Lodge would be oil burners. As a matter of fact, as coal-burning locomotives are received from the East to handling increased business on the Coast Lines, such engines are converted into oil burners before going into service.

"Aside from the advantage gained in fire prevention, there is no doubt but that with the use of oil-burning engines considerable credit is due to increased tonnage handled as against coal-burning engines; as there is no time on an oil-burning engine in good shape that the steam pressure cannot be held up to its maximum, regardless of how the locomotive may be worked. This is an impossibility with a coal-burning engine.

"Fuel oil storage and service facilities have been provided for at all terminals and of capacities to enable prompt fueling of engines. The fuel oil is received at terminals in tank cars and unloaded into sumps by gravity; sumps being located below track level. The fuel oil storage varies in capacity according to requirements, but consists generally of 500,000-gallon storage tank, 54,000-gallon service tank, and 14,000-gallon pump. At Tacoma a 50,000-barrel storage tank is located. In this tank is stored fuel oil which is unloaded direct from tank steamers. This large tank is intended for reserve supply, from which outside points would be supplied if undue conditions made it necessary.

"The cost to convert one of our modern locomotives from a coal burner to an oil burner is between $1,000 and $1,200."

FOREST NEWS NOTES

A recent examination of fire-killed timber on the St. Joe National Forest in Idaho discloses the fact that while deterioration in fire-killed white pine from checking has not advanced materially during the present summer as compared with the summer of 1912, the damage from the larvæ known as "sawyers" in trees still carrying their bark is very pronounced. Very little damage from this cause was noted previous to this year, but from present indications it would seem that this is a factor to be reckoned with.

* * *

For the fiscal year ending June 30, 1913, grazing permits were issued on Montana forests for 121,251 cattle, 15,858 horses, 716,191 sheep, and 900 goats. Compared with the preceding year the figures show substantial increases for all stock except goats, which show a decrease of 370 head. In all 2,312 permits were issued, a gain of 42 over the preceding fiscal year, and an increase of 5,570 cattle, 552 horses, and 29,803 sheep for 1912 is shown.

* * *

One of the large lumber companies of the Inland Empire region is taking an interesting step toward the practice of forestry. This concern is making a complete reconnaissance of all its timber holdings. The methods employed are almost identical with those of the present Forest Service work of District 1, and the data obtained is in practically the same form. A contour map and description of each forty is being prepared with the same care as the actual timber estimate. A considerable proportion of the personnel employed has had previous experience in Forest Service reconnaissance work.

* * *

On the Lolo National Forest in Montana it was found that the horny beetle is destroying the fire-killed timber very rapidly, as nearly every tree that had been felled in a timber sale was affected. This damage results in a marked deterioration in the value of the timber since timber that is full of grub holes can be utilized only for mining timbers, and since the demand for white pine mining timbers is limited, it is probable that a very large loss will result.

* * *

Approximately $30,000, or 35 per cent of the Government's receipts last year from grazing fees on the national forests of Montana, goes into the State for schools and roads, according to an announcement by the U. S. Forest Service. Returns to the Government from grazing resources in the State during the year total about $84,000, of which the counties in which the forests are situated get about $29,000. This is in addition to receipts of $177,000 from other forest resources, returning into the State a total of $90,000.

* * *

The deterioration of the great quantities of timber killed by the destructive fires of 1910 in Western Montana and Idaho is proceeding rapidly. Recent examination shows that while from the standpoint of checking and stain the timber is but little worse this year than it was in 1912, yet the "sawyer" beetles are now doing serious damage. The percentage of trees affected has increased, it is estimated for certain areas, from 10 per cent in 1912 to fully 50 per cent at the present time. This insect attack is of particular interest, since it has always been thought that the Inland Empire region was practically immune from serious damage from this source.

* * *

On September 4 President Wilson signed an executive order transferring approximately 111,400 acres of land from the Nebo to the Fillmore national forest, Utah.

The area embraced in this transfer comprises what is commonly known as the Scipio mountain division, which is separated from the main body of the

Fillmore forest by a narrow valley, approximately only two miles in width.

* * *

On September 5 the Secretary of Agriculture signed a water-power permit granting to the Sierra Electric Power Company the right to use for power development certain land within the Lassen national forest, California. The company is organized under the laws of the State of California and has its office and place of business in Oakland.

* * *

A recent executive order, signed by President Wilson, takes 160 acres from the Rio Grande national forest of Colorado to provide a site for a new town, Platoro, Colorado. It is pointed out that this elimination furnishes an example of how land is taken from the national forests when needed for a townsite or for other important public use that does not conflict with national-forest purposes.

* * *

There were only 144 cases of grazing trespass on the national forests during the past fiscal year, according to a report issued from the Forest Service. The service considers this remarkable, in view of the fact that the national forests contain 138,000,000 acres and have boundaries many thousands of miles in length. Nearly 32,000 grazing permits were issued, and more than 20,000,000 head of domestic animals grazed upon the forests for periods from a few days, in crossing, to a whole year.

* * *

Over $12,000, 10 per cent of national forest receipts in Wyoming during the past fiscal year, is available for expenditure by the Secretary of Agriculture on roads and trails within the State, according to the report of the U. S. Forest Service.

Such roads and trails are now being built on national forests in Wyoming, in accordance with the provision created by Congress for a "roads and trails fund," primarily to benefit local communities. The use of this 10 per cent of all national forest receipts is in addition to the 25 per cent of gross income which goes by law to the States direct for schools and roads.

* * *

Co-operative arrangements are announced by the Departments of Agriculture and the Interior which make possible the offering for sale of 630 million feet of merchantable timber in southeastern Arizona.

The stand covers the southeastern corner of the Sitgreaves national forest, the northwest edge of the Apache national forest, and the Fort Apache indian reservation. Besides 600 million feet of yellow-pine timber, there is 30 million feet of less important species, including Douglas fir, white fir, Engelmann spruce, Mexican white pine, blue spruce, and cork-bark fir.

Separate bids and contracts must be made for the timber upon the national forests and that upon the Indian reservation. Ten years will be allowed for the removal of the timber after the beginning of the cutting period, although a sufficient period will be given first for the construction of logging roads, mills, etc.

* * *

A substantial increase in sales of timber from national forests in Washington, Oregon, and Alaska, has been made during the past fiscal year, according to figures given out by the U. S. Forest Service.

With the close of the twelve-month ending June 30, 1913, the reported amount of Government timber cut in the States quoted aggregates 115,046,000 feet. The number of new sales is 673. The amount of timber actually sold reaches a total of 483,828,000 feet board measure. These figures show an increase over the previous year of 3,529,000 feet in amount of timber cut. The number of new sales in the fiscal year of 1912 was 656, as against 673 last year, while the amount of timber sold is greater by 282,980,000 feet.

* * *

Elk have been found in the Uinta national forest, Utah, for the first time in many years. Since they are not from shipments from the Jackson Hole country to neighboring forests, the State and Federal officials are gratified

at this apparent increase in big game, as the result of protection.

* * *

The U. S. Forest Service is using gasoline railway speeders for fire-protection purposes. They follow up trains on steep grades where sparks thrown out by forced draft are likely to start fires along the right of way.

* * *

Forest officers have found that high-power telescopes are not always satisfactory in fire-lookout work. In some localities heat vibrations in the atmosphere are so magnified by the glass that clearer vision can be had with the unaided eye.

* * *

There is much waste in getting out the flawless white oak necessary for tight barrel staves. The Forest Service is trying to get manufacturers of parquetry flooring to use some of this waste.

* * *

The U. S. consul at Aberdeen, Scotland, thinks that American manufacturers may have a chance to compete in furnishing staves for fish barrels. There has been a recent rise in the price of spruce and fir staves from Sweden and Scotland.

CO-OPERATION PREVENTS FOREST FIRES

REPORTS of forest fires from the States with which the Federal Government is co-operating show that there has been a general lack of unusual fire danger this year. This is not taken to mean that there have not been a great many fires, but that an efficient fire-fighting force has been adequate. Only two States, Massachusetts and Maine, have thus far found it necessary, because of extra serious fire hazard, to call upon the emergency provisions of their agreements with the Federal Government.

Maine has found it necessary to employ extra men over and above the normal allowance provided in its agreement. This any State may do under the terms of the agreement up to a certain fixed maximum, on the initiative of the State officer in charge of forest protection. He must, however, satisfactorily establish the existence of unusual hazard before the extra men will be paid. The forester at Washington has the further right under a serious emergency to waive this maximum provision, within the limits of the funds available, and authorize the State to employ any number of additional men that may seem necessary.

In Massachusetts this emergency has been of a somewhat different sort. Normal conditions of fire hazard, upon which are based all the agreements of the Federal Government with the States, in Massachusetts call for a distinct dry spring and fall fire season. Fire protection work may thus largely be discontinued during the midsummer months. However, because of long drouths, there has been practically no let-up in the fire danger to the present. A shortage of funds was imminent, but relief was secured by an amendment to the agreement, approved by the Secretary of Agriculture, by which the Federal Government expends $500 more and the State $1,000 more. Under any conditions, the law requires the State to spend as much money as the Federal Government. In the usual summer, the State spends on an average three dollars to the Federal Government's one; New York will spend at least ten dollars. The Government, however, will not necessarily adhere to the ratio established with a State confronted by an exceptional fire menace. In such emergencies it will help as far as its funds go in accordance with the needs of the situation.

SHEEP USED TO TRAP SPOTTED FEVER TICKS

THE free grazing of 2,500 head of sheep upon the Bitterroot National Forest, in the State of Montana, has been authorized by the Secretary of Agriculture as part of a novel experiment in trapping the deadly spotted fever tick. The forest service and the public health service are working together in cooperation with local sheep growers in this new campaign.

It is the general belief of the leading medical authorities that the mysterious and frequently fatal disease commonly known as spotted fever is spread by the tick Dermacentor andersoni which, in parts of the Bitterroot Forest, occurs in such abundance that it constitutes a real menace to man and beast. Surgeon McClintic, of the public health service, died last year of spotted fever contracted during his study of the disease and its control.

The plan proposed contemplates the grazing of two bands of sheep upon the parts of the forest where the tick is most abundant, with the idea that large numbers of the ticks will attach themselves to the sheep. Then, as occasion requires, the sheep will be freed of the ticks by being dipped in an insecticide solution, which will kill the ticks without in any way injuring the sheep.

The engorging of the female tick with blood is one of the essential functions of reproduction, and this gorging must of necessity take place upon the larger mammals which serve as hosts to the tick. The U. S. Biological Survey has reached the conclusion that the great bulk of the fever ticks which become filled with blood get their supply while attached to domestic stock, and that if the domestic animals are freed of ticks by dipping, by spraying, or by some other effective method of treatment, the chances of the infection of human beings will be vastly reduced. Of the different domestic animals the sheep is the most readily handled and the easiest to dip or treat, hence the selection of sheep for use in the experiment.

STATE NEWS

North Carolina

The regular meeting of the executive committee and officers of the North Carolina Forestry Association was held in the Chamber of Commerce room at Raleigh on Tuesday, September 30th. The work of the association for the coming winter season was planned.

As the special meeting of the Legislature will then be in session, the subject of forest protective laws will probably be taken up. In view of the past year's record of over one million dollars' damage to property from forest fires, the question of working for laws to protect the forests from fire has become of pressing importance. The recent collapse of the cattle industry in Brunswick County through an infringement of the quarantine regulations has brought once more to the front the question of statewide stock law, a measure which has long been advocated by our association as of first importance in perpetuating our eastern Carolina forests.

Now that the children of the schools are guaranteed six months' instruction, some regular means should be employed to instruct them in the importance and value of the forests to the State. The observance of an annual arbor day and the distribution of leaflets to the school children are both measures which are strongly advocated by the State association.

Washington

The fire season in Washington is nearing its close. The State has already laid off many men, and if by the end of September weather conditions remain as at present the entire force will be discharged.

This season so far has been a record breaker. Up to this date (September 9) the damage to standing green merchantable timber will not amount to $250 for the entire State. The loss in the timber line has been in cut up logs, and this has been very slight indeed, as well as the damage to equipment.

So far this season the State has been to an expense of less than $700 for extra help in

fighting fires, or about one-sixth that of last year.

The good record this year was made possible by the co-operation and assistance rendered by the United States Forest Service and the Washington Forest Fire Association, which is composed of the timbermen of the State. All have worked together in perfect harmony, and are now making preparations for a general meeting at which it is expected to formulate plans which will make the work in the State more successful and satisfactory than ever before. State Forester Ferris says he cannot speak too highly of the assistance rendered to this department by the United States Service and the association above referred to.

The United States and Washington Forest Fire Association supervisors and rangers, the federal patrolmen and the county wardens have left nothing undone which they considered would be beneficial to the service. They have worked up a sentiment of friendship and co-operation among the settlers, and have made friends of those who used to consider us their enemies. They have carried on their work for the benefit of the farmer, logger, millman and timberman alike, and they are entitled to very much credit for the record which has been made.

Pennsylvania

The newest proposition in the Pennsylvania Department of Forestry work is the installation of the forestry exhibit at Pittsburgh in connection with the exhibit of the Western Pennsylvania Exposition Society, where thousands of people will visit it until the middle of October. The department has in the exhibit a collection of logs, showing the bark and various grains of wood; a complete collection of Pennsylvania tree seeds; a number of injurious and beneficial forest insects; a collection of tree fungi; leaf specimens; charts showing the growth of trees; photographs showing forest conditions in the State and upon State forests; transparencies showing tree flowers; German forest scenes and scenes showing desolate scenes in Pennsylvania. There is also an erosion model and a relief map of the State of Pennsylvania, showing the location of State forests.

On September 3 ten students were admitted to the State Forest Academy.

This last month was published a forest fire poster which has already received a remarkable amount of attention from the newspapers of the State. The department got in touch with all of the railroads within our borders, and from most of them has had requests that posters be sent to them to be placed by their officials in all of the stations along their lines. Several of the railroads this fall will place in their folders pargaraphs with reference to forest fires.

The department has just issued three circulars primarily to be distributed at the Pittsburgh Exposition, but at the same time for general distribution throughout the State. One is with reference to forest fires, one with reference to State forests, and one with reference to auxiliary forest reserves.

New York

The Hammond Lumber Company of California sent to the College of Forestry at Syracuse in July a heavy plank from one of the giant redwoods which has a dimension of 7 by 11 feet. This is probably the largest solid plank of any kind of wood in New York State, outside of the Museum of Natural History in New York City. Besides this piece of redwood, the college has secured recently what is thought to be the largest trunk of an ironwood, so far found in New York State. This ironwood trunk has a diameter at the base of 25 inches and came from a tree growing under very favorable circumstances on the city forest at Syracuse. The college is securing valuable specimens of timber from all parts of the State for its museum, with the idea of making the forest museum of the College of Forestry the most complete of its kind in the United States.

Georgia

During July and August Professor Akerman and Mr. B. M. Lufburrow traveled down the Oconee system. They put a canoe in the river near the Forest School, and followed that liquid track down through Middle Georgia, the Altamaha Grit region, and the Coastal Plain proper, on out to Darien on the Atlantic. They took many notes and photographs and collected over a hundred specimens for the School herbarium.

During the early part of September Professor Akerman spent some time at the Berry School for country boys, where he went at the invitation of Mr. Robert Adams, the principal, to make a series of talks to the boys. In addition to the talks there were several excursions into the woods of Floyd County.

The students who spent their summer terms in the lumber camps in the mountains have returned with much experience, a swinging gait in their legs and a browned, healthy look that is good to see.

A TREE PLANTING MACHINE.

Experiments with a tree planting machine at the Utah Agricultural Experiment Station indicate that it may be used to advantage in reforesting old burned areas on the national forests.

OTHER CHINESE STUDENTS

It appears that Woon Young Chun, a young Chinese student at the New York State College of Forestry, is not the only Chinese undergraduate in forestry in this country. There are two others at the Yale Forestry School, Dan Yan Lin, who entered in July, 1912, and F. L. Chang, who entered last July.

Dr. Filibert Roth, of the Michigan Forestry School, at Ann Harbor, reports that Mr. Ngan Han graduated there in 1911, and is now in the Chinese Department of Agriculture and Forestry.

EDUCATIONAL NOTES

Mr. Rufus S. Maddox, United States Forest Service, Quincey, Cal., has accepted the position as instructor in forestry at the Pennsylvania State College. Mr. Maddox is a graduate of Yale University and of the Yale Forest School, and has had nearly four years of experience in the United States Forest Service, on the Plumas National Forest, where he has been in charge of timber sales. He is a member of the Society of American Foresters.

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